

=> FILE REG

FILE 'REGISTRY' ENTERED ON 28 AUG 2007

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=> DISPLAY HISTORY FULL L1-

FILE 'REGISTRY'

E CERIUM OXIDE/CN

L1 2 SEA "CERIUM OXIDE"/CN  
L2 91 SEA (CE (L) O)/ELS (L) 2/ELC.SUB  
L3 92 SEA L1 OR L2

FILE 'HCA'

L4 2546 SEA L3/P  
L5 1222 SEA RAMP?(2A)(TEMP# OR TEMPERATUR?)  
L6 17734 SEA (SLOW? OR STEADY? OR STEADIL?)(2A)(HEAT? OR WARM? OR  
THERMAL? OR THERMO?)  
L7 473404 SEA (RISE# OR RISING# OR RAIS? OR ELEVAT? OR INCREAS? OR  
HIGHER? OR HEIGHTEN?)(2A)(TEMP# OR TEMPERATUR?)  
L8 1 SEA .DEG.C(W)(HOUR# OR HR# OR H)

FILE 'HCAPLUS'

L9 17196 SEA OTA ?/AU  
L10 5410 SEA TANIMOTO ?/AU  
L11 13 SEA TAKAKUMA ?/AU  
L12 5 SEA L9 AND L10 AND L11  
L13 318837 SEA (.DEG. OR .DEGREE.)(2W)(HOUR# OR HR# OR H)  
L14 8393 SEA L3 (L) (PRODUC? OR PROD# OR GENERAT? OR MANUF? OR  
MFR# OR CREAT? OR FORM## OR FORMING# OR FORMAT? OR MAKE#  
OR MADE# OR MAKING# OR FABRICAT? OR SYNTHESI? OR PREPAR?  
OR PREP#)  
L15 4374 SEA (CEO OR CEO2 OR (CERIUM# OR CE)(W)(OXIDE# OR  
DIOXIDE#))(2A)(PRODUC? OR PROD# OR GENERAT? OR MANUF? OR  
MFR# OR CREAT? OR FORM## OR FORMING# OR FORMAT? OR MAKE#  
OR MADE# OR MAKING# OR FABRICAT? OR SYNTHESI? OR PREPAR?  
OR PREP#)  
L16 5 SEA (L4 OR L14 OR L15) AND L5  
L17 15 SEA (L4 OR L14 OR L15) AND L6  
L18 449 SEA (L4 OR L14 OR L15) AND L7  
L19 0 SEA (L4 OR L14 OR L15) AND L8  
L20 410 SEA (L4 OR L14 OR L15) AND L13  
L21 31 SEA L18 AND L20  
L22 30919 SEA L3

L23 425 SEA L22 AND L18  
 L24 379 SEA L22 AND L20  
 L25 28 SEA L23 AND L24  
 L26 193935 SEA (TEMP# OR TEMPERATUR?)(2A)RANG?  
 L27 757964 SEA (400 OR 425 OR 450 OR 475 OR 500 OR 525 OR 550 OR  
 575 OR 600 OR 625 OR 650 OR 675 OR 700 OR 725 OR 750 OR  
 775 OR 800 OR 825 OR 850 OR 875 OR 900 OR 925 OR 950 OR  
 975 OR 1000 OR 1025 OR 1050 OR 1075 OR 1100 OR 1125 OR  
 1150 OR 1175 OR 1200)(2A)(.DEG. OR .DEGREE. OR DEGREE#)  
 L28 188 SEA (L4 OR L14 OR L15) AND L26  
 L29 2143 SEA (L4 OR L14 OR L15) AND L27  
 L30 89 SEA L28 AND L29  
 L31 25 SEA L18 AND L28  
 L32 186 SEA L18 AND L29  
 L33 7 SEA L20 AND L28  
 L34 266 SEA L20 AND L29  
 L35 23 SEA L32 AND L34  
 L36 14 SEA L30 AND L32  
 L37 6 SEA L30 AND L34  
 L38 11 SEA L16 OR L37  
 L39 27 SEA (L17 OR L36) NOT L38  
 L40 39 SEA (L25 OR L31 OR L35) NOT (L38 OR L39)  
 L41 0 SEA L21 NOT (L38 OR L39 OR L40)  
 L42 8 SEA 1840-2002/PY,PRY AND L38  
 L43 14 SEA 1840-2002/PY,PRY AND L39  
 L44 23 SEA 1840-2002/PY,PRY AND L40  
 L45 32 SEA (L38 OR L39 OR L40) NOT (L42 OR L43 OR L44)

=> FILE HCA

FILE 'HCA' ENTERED ON 28 AUG 2007

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=> D L42 1-8 BIB ABS HITSTR HITIND

L42 ANSWER 1 OF 8 HCA COPYRIGHT 2007 ACS on STN

AN 140:367126 HCA Full-text

TI Manufacture of cerium oxide particle  
for polishing silica substrate

IN Ota, Isao; Tanimoto, Kenji; Takakuma, Noriyuki

PA Nissan Chemical Industries, Ltd., Japan

SO PCT Int. Appl., 38 pp.

CODEN: PIXXD2  
 DT Patent  
 LA Japanese  
 FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI WO 2004037722	A1	20040506	WO 2003-JP13754	20031028
W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, KE, KG, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG				
JP 2004168638	A	20040617	JP 2003-357661	20031017
JP 2004168639	A	20040617	JP 2003-357664	20031017
AU 2003275697	A1	20040513	AU 2003-275697	20031028
CN 1708458	A	20051214	CN 2003-80102269	20031028
US 2006150526	A1	20060713	US 2005-532316	20050422
PRAI JP 2002-312860	A	20021028	<--	
JP 2002-312869	A	20021028	<--	
WO 2003-JP13754	W	20031028		

AB The invention relates to a process for making cerium oxide particles by heating a cerium compd. to raise the temp. of the compd. from ordinary temp. to a temp. range of 400° to 1200°, which comprises at least either the temp.-rise step of heating at a rate of temp. rise of 2° to 60°/h or the temp.-rise step of heating while feeding a moistened gas. According to the process, cerium oxide powder having a narrow diam. distribution of primary particles can be obtained. Further, when an aq. cerium oxide slurry made by using the powder is used as an abrasive, high-quality polished surfaces can be attained without lowering the rate of polishing, which brings about an enhancement in the productivity of the polishing step and a lowering in the cost. The aq. cerium oxide slurry is useful particularly as an abrasive for the fine polishing of substrates contg. silica as the main component.

IT 11129-18-3, Cerium oxide  
(manuf. of cerium oxide particle  
for polishing silica substrate)

RN 11129-18-3 HCA

CN Cerium oxide (CA INDEX NAME)

\*\*\* STRUCTURE DIAGRAM IS NOT AVAILABLE \*\*\*

IC ICM C01F017-00

ICS C09K003-14; B24B037-00; H01L021-304

CC 76-3 (Electric Phenomena)

IT Polishing materials  
(abrasive pastes; manuf. of cerium  
oxide particle for polishing silica substrate)

IT Polishing  
(chem.-mech.; manuf. of cerium oxide  
particle for polishing silica substrate)

IT Firing (heat treating)  
(manuf. of cerium oxide particle  
for polishing silica substrate)

IT Abrasives  
(polishing pastes; manuf. of cerium  
oxide particle for polishing silica substrate)

IT 11129-18-3, Cerium oxide  
(manuf. of cerium oxide particle  
for polishing silica substrate)

IT 7631-86-9, Silica, processes  
(manuf. of cerium oxide particle  
for polishing silica substrate)

L42 ANSWER 2 OF 8 HCA COPYRIGHT 2007 ACS on STN

AN 134:140534 HCA Full-text

TI Methods of making a superconductor multilayer with few  
temperature ramps

IN Zhang, Wei; Rupich, Martin W.; Li, Qi

PA American Superconductor Corporation, USA  
 SO PCT Int. Appl., 52 pp.  
 CODEN: PIXXD2  
 DT Patent  
 LA English  
 FAN.CNT 10

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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PI	WO 2001008231	A2	20010201	WO 2000-US19290	20000714

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WO 2001008231 A3 20010830  
 W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZW  
 RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG

US	6562761	B1	20030513	US 2000-500717	20000209
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AU	200113250	A	20010213	AU 2001-13250	20000714
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WO	2001011428	A1	20010215	WO 2000-US19215	20000714
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WO 2001011428 A8 20011011  
 WO 2001011428 A9 20020725  
 W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZW  
 RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG

AU	200117509	A	20010305	AU 2001-17509	
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200007  
14

US 6669774                      B1        20031230        <--  
US 2000-615991

200007  
14

US 6828507                      B1        20041207        <--  
US 2000-617518

200007  
14

US 6893732                      B1        20050517        <--  
US 2000-616810

200007  
14

US 2002144838                    A1        20021010        <--  
US 2002-154566

200205  
24

US 6765151                      B2        20040720  
PRAI US 1999-145468P              P        19990723        <--  
US 1999-166140P                  P        19991118        <--  
US 1999-166145P                  P        19991118        <--  
US 1999-166297P                  P        19991118        <--  
US 2000-500701                   A        20000209        <--  
US 2000-500717                   A        20000209        <--  
US 2000-500718                   A        20000209        <--  
US 2000-616810                   A        20000714        <--  
US 2000-617518                   A3       20000714        <--  
WO 2000-US19215                  W        20000714        <--  
WO 2000-US19290                  W        20000714        <--

AB    The invention relates to methods of making a superconductor. The  
      comps. can be used in methods using relatively few temp. ramps,  
      varying pressures of H2O vapor, and/or isothermal treatment steps.  
      The methods and comps. can be used to form superconductor material  
      intermediates that have relatively few cracks and/or blisters.

IT    1306-38-3, Cerium dioxide, processes  
      (buffer; in making superconductor multilayer with few  
      temp. ramps)

RN    1306-38-3    HCA

CN    Cerium oxide (CeO2)    (CA INDEX NAME)



IC ICM H01L039-00  
 CC 76-4 (Electric Phenomena)  
 IT Heat treatment  
     (in making superconductor multilayer with few temp.  
     ramps)  
 IT Electronic device fabrication  
     Multilayers  
     Superconducting films  
     Superconductor devices  
         (making superconductor multilayer with few temp.  
         ramps)  
 IT Cuprates, processes  
     (making superconductor multilayer with few temp.  
     ramps)  
 IT Water vapor  
     (making superconductor multilayer with few temp.  
     ramps using)  
 IT Fluorides, processes  
     (oxyfluorides; in making superconductor multilayer with few  
     temp. ramps)  
 IT Coating process  
     (spin; in making superconductor multilayer with few temp.  
     . ramps)  
 IT 1314-36-9, Yttrium oxide (Y2O3), processes  
     (YSZ buffer; making superconductor multilayer with few  
     temp. ramps)  
 IT 1306-38-3, Cerium dioxide, processes 1314-23-4, Zirconium  
     oxide (ZrO2), processes 64417-98-7, Yttrium zirconium oxide  
     (buffer; in making superconductor multilayer with few  
     temp. ramps)  
 IT 7782-44-7, Oxygen, processes 16712-25-7, Copper  
     bis(trifluoroacetate) 37737-28-3, Yttrium trifluoroacetate  
     60884-92-6, Barium trifluoroacetate  
     (in making superconductor multilayer with few temp.  
     ramps)  
 IT 107539-20-8P, Barium copper yttrium oxide 121339-20-6P, Barium  
     calcium copper strontium oxide  
     (making superconductor multilayer with few temp.  
     ramps)  
 IT 109064-29-1DP, Barium copper yttrium oxide (Ba2Cu3YO7),  
     oxygen-deficient  
     (making superconductor multilayer with few temp.  
     ramps)

L42 ANSWER 3 OF 8 HCA COPYRIGHT 2007 ACS on STN  
 AN 131:221390 HCA Full-text  
 TI Crystallization of yttria- and ceria-stabilized zirconia obtained

from homogeneous precipitation with urea  
AU de Oliveira, Ana Paula Almeida; de Barros, Sandra Decourt; Torem,  
Mauricio Leonardo  
CS Engenharia Metalurgica, Brazil  
SO Congresso Anual - Associacao Brasileira de Metalurgia e Materiais (1998), Volume Date 1997, 52nd(II Congresso Internacional de Tecnologia Metalurgica e de Materiais), 2722-2742  
CODEN: CAAMEU  
PB Associacao Brasileira de Metalurgia e Materiais  
DT Journal; (computer optical disk)  
LA Portuguese  
AB Pure ZrO<sub>2</sub>, ZrO<sub>2</sub>-Y<sub>2</sub>O<sub>3</sub> and ZrO<sub>2</sub>-CeO<sub>2</sub> were produced by homogeneous pptn. with urea from Zr oxychloride, Y chloride and Ce chloride. The effect of these stabilizers, as well as process variables such as temp., time and urea concn., on the crystn. of these powders was studied and discussed adopting differential scanning calorimeter (DSC) and XRD. The temp. of the reactions that occur along the heating of powders previously dried at 50. degree. for 12 h were detd. by DSC using ultrapure argonium at a heating rate of 10°/min-1 from room temp. to 650°. Cryst. phases were detd. by XRD. Pure zirconia presented crystn. reaction at 480° resulting in a partially stabilized tetragonal zirconia. In the presence of yttria, this reaction occurred between 480° and 520°. However, in the presence of ceria the range of crystn. temp. was between 530°-640°. Cooling step showed that these reaction were irreversible.  
CC 75-1 (Crystallography and Liquid Crystals)  
RE.CNT 14 THERE ARE 14 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L42 ANSWER 4 OF 8 HCA COPYRIGHT 2007 ACS on STN  
AN 129:220321 HCA Full-text  
TI Physicochemical and catalytic properties of CeO<sub>2</sub>-ZrO<sub>2</sub> solid solutions supported and dispersed on γ-Al<sub>2</sub>O<sub>3</sub>  
AU Nunan, John G.  
CS ASEC Manufacturing, USA  
SO Society of Automotive Engineers, [Special Publication] SP (1997), SP-1288(Zirconium in Emission Control), 77-86  
CODEN: SAESA2; ISSN: 0099-5908  
PB Society of Automotive Engineers  
DT Journal  
LA English  
AB Three-way conversion (TWC) catalyst supports were prepd. having CeO<sub>2</sub>-ZrO<sub>2</sub> solid soln. particles uniformly dispersed on γ-Al<sub>2</sub>O<sub>3</sub> as discrete crystallites. Support morphol. was characterized using scanning transmission electron microscopy (STEM) and transmission electron microscopy (TEM) anal. Temp. programmed redn. (TPR) and x-ray diffraction (XRD) analyses were also conducted on precious metal



(PM)-contg. and PM-free samples before and after aging. Results were combined with performance measurements to demonstrate the beneficial effect of solid soln. formation on TWC catalyst activity. STEM and TEM anal. showed that well-dispersed CeO<sub>2</sub>-ZrO<sub>2</sub> solid soln. particles could be formed and simultaneously supported on a high surface area  $\gamma$ -Al<sub>2</sub>O<sub>3</sub> support. For samples calcined at  $\leq 600^\circ$ , crystallite sizes  $\leq 50$  Å were formed vs. sizes  $> 200$  Å in aged samples. TPR results suggested that for supports calcined at  $\leq 600^\circ$ , most CeO<sub>2</sub> present was reduced from the Ce<sup>4+</sup> to the Ce<sup>3+</sup> state at 250–700. degree.. H<sub>2</sub> uptake in this temp. range was assigned to redn. of Ce<sup>4+</sup> ions at the surface or sub-surface of CeO<sub>2</sub> crystallites. Addn. of Pt and Rh to the supports resulted in a synergistic redn. of PM and CeO<sub>2</sub>; most of the CeO<sub>2</sub> was reduced, esp. solid soln. contg. samples. After aging, it was further shown that CeO<sub>2</sub>-ZrO<sub>2</sub> solid soln. formation clearly promoted CeO<sub>2</sub> redn. at temps. typically assocd. with surface CeO<sub>2</sub> redn. Thus, CeO<sub>2</sub>-ZrO<sub>2</sub> supported and dispersed solid solns. showed the same enhancements in redox activity as obsd. earlier for non-supported materials. XRD anal. confirmed that solid soln. formation occurred for Zr-contg. samples, giving a qual. measure of the CeO<sub>2</sub> crystallite size. Performance measurements were made on Zr-free and Zr-contg. air aged samples washcoated onto monolith substrates. For these catalysts, performance advantages were obsd. for Zr-contg. samples after lab. aging at 1000. degree. for 24 h in air. Aged sample characterization using a combination of XRD and TEM further confirmed that morphol. consisted of evenly dispersed CeO<sub>2</sub>-ZrO<sub>2</sub> solid soln. crystallites on the Al<sub>2</sub>O<sub>3</sub> surface. Similar CeO<sub>2</sub> crystallite size trends were obsd. in XRD and TEM analyses; doping with Zr stabilized the CeO<sub>2</sub> with respect to sintering.

CC 59-3 (Air Pollution and Industrial Hygiene)

Section cross-reference(s): 51, 67

RE.CNT 27 THERE ARE 27 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L42 ANSWER 5 OF 8 HCA COPYRIGHT 2007 ACS on STN

AN 129:139904 HCA Full-text

TI NO + CO  $\rightarrow$  1/2 N<sub>2</sub> + CO<sub>2</sub> differentiated from 2NO + CO  $\rightarrow$   
N<sub>2</sub>O + CO<sub>2</sub> over rhodia/ceria catalysts using 15N180 and 13C160  
reactants or time-resolution of products

AU Cunningham, Joseph; Hickey, Neal J.; Farrell, Frank; Bowker, M.;  
Weeks, Colin

CS Chemistry Department, University College Cork, Ire.

SO Studies in Surface Science and Catalysis (1998),  
116(Catalysis and Automotive Pollution Control IV), 409-418  
CODEN: SSCTDM; ISSN: 0167-2991

PB Elsevier Science B.V.

DT Journal

LA English

AB Profiles vs. ramp-temp. for isotope exchange between  $^{15}\text{N}_2$  and 0.5%  $\text{RhOx/CeO}_2$ ,  $\text{CeO}_2$ , or  $\text{Rh}_2\text{O}_3$  materials within a re-circulatory reactor system indicated unique low-temp. lability of  $^{16}\text{O}$ -surface species at  $\text{Rh}_2\text{O}_3\text{-CeO}_2$  perimeter positions upon pre-oxidized 0.5%  $\text{RhOx/CeO}_2$  and its absence there from after LTR. Likewise, onset temps. and relative efficiencies were compared for conversion of  $^{15}\text{N}_2$  plus  $^{13}\text{C}_2$  mixts. to isotopically distinguishable forms of  $\text{N}_2\text{O}$ ,  $\text{N}_2$ , and  $\text{CO}_2$  products over pre-oxidized and pre-reduced materials. Complementary insights into the time-sequence for appearance of  $\text{N}_2\text{O}$  and  $\text{N}_2$  products in the gas phase over the materials at selected temps. at  $125\text{-}298^\circ$  are provided by results conducted in an alternative micro-reactor system which allowed introduction of individual 10s pulses of  $\text{CO}$  into a continuous flow of  $\text{NO}$  plus  $\text{He}$  over pre-oxidized or pre-reduced aliquots of materials.

IT 1306-38-3, Ceria, uses  
 (rhodia and; activity and selectivity of pre-oxidized and pre-reduced rhodia/ceria three way catalysts to differentiate  $\text{NO} + \text{CO} \rightarrow 1/2 \text{N}_2 + \text{CO}_2$  from  $2\text{NO} + \text{CO} \rightarrow \text{N}_2\text{O} + \text{CO}_2$  using  $^{15}\text{N}_2$  and  $^{13}\text{C}_2$  reactants or time-resoln. of products  
 )

RN 1306-38-3 HCA

CN Cerium oxide ( $\text{CeO}_2$ ) (CA INDEX NAME)



CC 59-3 (Air Pollution and Industrial Hygiene)  
 Section cross-reference(s): 51, 67

IT 1306-38-3, Ceria, uses  
 (rhodia and; activity and selectivity of pre-oxidized and pre-reduced rhodia/ceria three way catalysts to differentiate  $\text{NO} + \text{CO} \rightarrow 1/2 \text{N}_2 + \text{CO}_2$  from  $2\text{NO} + \text{CO} \rightarrow \text{N}_2\text{O} + \text{CO}_2$  using  $^{15}\text{N}_2$  and  $^{13}\text{C}_2$  reactants or time-resoln. of products  
 )

RE.CNT 15 THERE ARE 15 CITED REFERENCES AVAILABLE FOR THIS RECORD  
 ALL CITATIONS AVAILABLE IN THE RE FORMAT

L42 ANSWER 6 OF 8 HCA COPYRIGHT 2007 ACS on STN

AN 128:211589 HCA Full-text

TI Growth and analysis of  $\text{CeO}_2$  thin films on  $\text{Si}(111)$  substrate prepared by electron-beam evaporation

AU Kim, Chong Geol; Kim, Kwan Pyo; Lee, Ju Bong; Han, Ki Pyung; Park, Chong Yun; Jang, Hyun Duck

CS Department of Physics, Sung Kyun Kwan University, Suwon, 440-746, S.

Korea

SO Journal of the Korean Physical Society (1998), 32(1),  
64-70  
CODEN: JKPSDV; ISSN: 0374-4884

PB Korean Physical Society

DT Journal

LA English

AB The microstructure of a CeO<sub>2</sub> layer grown on a (111) silicon substrate by using high-vacuum evapn. was studied for the cleaning and deposition conditions. The microstructure in the CeO<sub>2</sub> layer is an amorphous, nano-cryst., or columnar structure, depending on the growth conditions. The epitaxial CeO<sub>2</sub> layer on Si(111) has good crystal quality for hydrogen termination on the silicon surface(H-Si), two-step deposition, and substrate heating at 400°. This epitaxial layer has a columnar structure with high crystal quality. It is desirable to keep the H-termination on the silicon surface in order to prevent silicon surface oxidn. during the initial growth step. However, the capacitance-voltage and the current-voltage curves of the film are noisy curve and show a low oxide breakdown voltage owing to many dangling bonds on the columnar grain boundaries. The CeO<sub>2</sub> layer grown on Si(111) has a slightly larger and denser columnar structure for a ramping up substrate temp. at 400°. This epitaxial CeO<sub>2</sub> layer shows the growth of mainly a (111) crystallog. orientation in x-ray diffraction pattern and has a stable C-V response and, from the I-V curve, a low dielec. strength. If some intermediate SiO<sub>2</sub> is in the as-deposited film, the C-V curves have a hysteresis (ΔV) due to trapped charges near the interfaces (CeO<sub>2</sub>/SiO<sub>2</sub> and SiO<sub>2</sub>/Si). In order that the CeO<sub>2</sub> layer have good elec. characteristics, it is desirable to increase the packing d. of the CeO<sub>2</sub> layer during deposition, to anneal the film in an ambient (O<sub>2</sub> or N<sub>2</sub>), and to make the intermediate SiO<sub>2</sub> by oxidn. In the at. force microscopic images, the films show smooth surfaces and increasing grain size with increasing substrate temp. Since the evaporator has a low-energy system (0.1-0.2 eV) for evapg. species (CeO<sub>2</sub>, Ce<sub>2</sub>O<sub>3</sub>), the grain size of CeO<sub>2</sub> layer is small. To increase the grain size laterally, the energy needs to be supplied externally by the ion source in the evaporator.

IT 1306-38-3, Cerium dioxide, properties  
(growth and anal. of CeO<sub>2</sub> thin films on Si(111) substrate  
prepd. by electron-beam evapn.)

RN 1306-38-3 HCA

CN Cerium oxide (CeO<sub>2</sub>) (CA INDEX NAME)



CC 76-3 (Electric Phenomena)  
 Section cross-reference(s): 67, 72, 73  
 IT 1306-38-3, Cerium dioxide, properties  
 (growth and anal. of CeO<sub>2</sub> thin films on Si(111) substrate  
 prep'd. by electron-beam evapn.)  
 RE.CNT 22 THERE ARE 22 CITED REFERENCES AVAILABLE FOR THIS RECORD  
 ALL CITATIONS AVAILABLE IN THE RE FORMAT

L42 ANSWER 7 OF 8 HCA COPYRIGHT 2007 ACS on STN  
 AN 123:60565 HCA Full-text  
 TI Manufacture of composite catalysts for synthesis gas manufacture by  
 oxidative conversion of methane or natural gas  
 IN Choudhary, Vasant R.; Rane, Vilas H.; Rajput, Amarjeet M. R.  
 PA Council of Scientific and Industrial Research, India  
 SO U.S., 12 pp.  
 CODEN: USXXAM  
 DT Patent  
 LA English  
 FAN.CNT 2

	PATENT NO. -----	KIND ----	DATE -----	APPLICATION NO. -----	DATE
PI	US 5411927	A	19950502	US 1992-930007	199208 14
				<--	
	US 5368835	A	19941129	US 1993-33106	199303 16
				<--	

PRAI EP 1992-306906 19920729 <--  
 US 1992-930007 A3 19920814 <--

AB The process for manufg. synthesis gas comprises passing continuously  
 a gaseous mixt. comprising CH<sub>4</sub> (or natural gas) and O (or air) with  
 or without water vapor over reduced or unreduced composite catalyst  
 contg. oxides having general formula T<sub>m</sub>.N<sub>n</sub>.R.O<sub>p</sub> (T is ≥1 of Ni, CO,  
 and Ir, and the like; m = T/R mol. ratio; N = transition or  
 nontransition element selected from ≥1 of Ti, Zr, Hf, Zn, Mg, Ca, and  
 the like; n = N/R mol. ratio; R = rare earth element selected from ≥1  
 of La, Ce, Pr, Ho, Yb, and the like; p = no. of O atoms required to  
 satisfy the valence requirement of the elements in the composite  
 catalyst). The synthesis gas is produced in high yields and at very  
 high prodn. rates by oxidative conversion of CH<sub>4</sub> or natural gas to CO  
 and H or synthesis gas, using the composite catalyst contg.  
 nontransition and/or transition metal oxides. Thus, 7.0 g powd.  
 Yb<sub>2</sub>O<sub>3</sub>, 10.34 g powd. Ni(NO<sub>3</sub>)<sub>2</sub>·6H<sub>2</sub>O and 1.0 mL deionized water were

mixed, and the resulting thick paste was dried in air at 120° for 6 h. The dried mass was decompd. in air at 605° for 4 h. The decompd. mass was then powd., pressed without binder at 4 ton pressure and crushed to particle size 20-30 mesh. The catalyst particles were then calcined in air at 900.degree . for 4 h to give a NiO.Yb2O3 catalyst having surface area 6.30 m2/g. The catalyst was used for the oxidative conversion of CH4 to CO and H, i.e., synthesis gas, at temps. ranging from 602 to 702, 803, 496, and 298°. The effluent gas was cooled to about 0° to condense the water formed in the reaction and then analyzed for CO, CO2, H, and unconverted CH4 and O. The conversion of CH4 was 80.6, 84.9, 89.3, 74.0, and 71.1%, and the selectivity for CO was 92.6, 95.2, 97.4, 89.8, and 84.4%, resp.

IT 11129-18-3, Cerium oxide

(composite oxide catalyst manuf. for synthesis  
gas manuf. by oxidative conversion of methane and  
natural gas)

RN 11129-18-3 HCA

CN Cerium oxide (CA INDEX NAME)

\*\*\* STRUCTURE DIAGRAM IS NOT AVAILABLE \*\*\*

IC ICM B01J037-14

ICS B01J023-78; B01J023-10; B01J023-58

INCL 502302000

CC 49-1 (Industrial Inorganic Chemicals)

IT 1305-78-8, Calcia, uses 1307-96-6, Cobalt oxide, uses 1308-87-8,  
Dysprosium oxide 1308-96-9, Europium oxide 1309-48-4, Magnesia,  
uses 1312-81-8, Lanthanum oxide 1313-97-9, Neodymium oxide  
1313-99-1, Nickel oxide, uses 1314-37-0, Ytterbium oxide  
11113-84-1, Ruthenium oxide 11129-18-3, Cerium oxide  
12032-20-1, Lutetium oxide 12036-25-8, Promethium oxide  
12036-32-7, Praseodymium oxide 12036-41-8, Terbium oxide  
12036-44-1, Thulium oxide 12055-62-8, Holmium oxide 12060-58-1,  
Samarium oxide 12061-16-4, Erbium oxide 12064-62-9, Gadolinium  
oxide 12624-27-0, Rhenium oxide

(composite oxide catalyst manuf. for synthesis  
gas manuf. by oxidative conversion of methane and  
natural gas)

L42 ANSWER 8 OF 8 HCA COPYRIGHT 2007 ACS on STN

AN 117:218553 HCA Full-text

TI Rare earth oxide-based ceramics, and their manufacture

IN Chane-Ching, Jean Yves; Orange, Gilles

PA Rhone-Poulenc Chimie SA, Fr.

SO Fr. Demande, 16 pp.

CODEN: FRXXBL

DT Patent

LA French

FAN.CNT 1

	PATENT NO. -----	KIND ----	DATE -----	APPLICATION NO. -----	DATE
PI	FR 2667590	A1	19920410	FR 1990-12279	199010 05

<--

PRAI FR 1990-12279 19901005 <--

AB The ceramics contain  $\geq 98$  mol.% rare earth oxides, and have av. crystallite size 0.4-3  $\mu\text{m}$ , d.  $\geq 94\%$  of the theor. d. of the corresponding rare earth oxide. The ceramics are manufd. by sintering compns. contg.  $\geq 98$  mol.% (as oxide) rare earth compd. having av. particle size  $< 1 \mu\text{m}$ . As a result of their very small crystallite size, these ceramics have improved mech. properties. A powd. mixt. consisting of Gd<sub>2</sub>O<sub>3</sub> powder (av. particle size 0.7  $\mu\text{m}$ ) contg. 0.5 mol.% Nb<sub>2</sub>O<sub>5</sub> (av. particle size 0.5  $\mu\text{m}$ ) was molded, and the greenware sintered in oxidizing atm. at 1500° for 2 h (temp. ramp. in heating and cooling 400°/h) to give ceramics having d. 7.87 (95.6% of theor.), vs. 7.23 g/cm<sup>3</sup> (88.2% of theor.) for Gd<sub>2</sub>O<sub>3</sub> ceramics.

IT 11129-18-3P, Cerium oxide  
(ceramics, manuf. of, sintering aids for, for d. and strength)

RN 11129-18-3 HCA

CN Cerium oxide (CA INDEX NAME)

\*\*\* STRUCTURE DIAGRAM IS NOT AVAILABLE \*\*\*

IC ICM C04B035-50

CC 57-2 (Ceramics)

IT 1308-87-8P, Dysprosium oxide (Dy<sub>2</sub>O<sub>3</sub>) 1308-96-9P, Europium oxide  
1314-37-0P, Ytterbium oxide 11129-18-3P, Cerium  
oxide 12060-58-1P, Samarium oxide (Sm<sub>2</sub>O<sub>3</sub>) 12061-16-4P,  
Erbium oxide 12064-62-9P, Gadolinium oxide (Gd<sub>2</sub>O<sub>3</sub>) 12738-76-0P,  
Terbium oxide 39455-61-3P, Holmium oxide 39455-67-9P, Lutetium  
oxide 39455-81-7P, Thulium oxide  
(ceramics, manuf. of, sintering aids for, for d. and strength)

=> D L43 1-14 BIB ABS HITSTR HITIND

L43 ANSWER 1 OF 14 HCA COPYRIGHT 2007 ACS on STN

AN 138:179004 HCA Full-text

TI Method of producing thermistor element, and production apparatus for producing raw materials for thermistor element

IN Kuzuoka, Kaoru; Ogata, Itsuhei; Makino, Daisuke; Yorinaga, Muneo

PA Denso Corp., Japan

SO U.S. Pat. Appl. Publ., 38 pp.

CODEN: USXXCO

DT Patent  
LA English  
FAN.CNT 1

	PATENT NO. ----- -----	KIND ----	DATE -----	APPLICATION NO. -----	DATE
PI	US 2003038704	A1	20030227	US 2002-227805	200208 27
				<--	
	US 6824713	B2	20041130		
	JP 2003068507	A	20030307	JP 2001-256150	200108 27
	JP 2003119080	A	20030423	JP 2001-311723	200110 09
	DE 10239058	A1	20030403	DE 2002-10239058	200208 26
				<--	
	FR 2830669	A1	20030411	FR 2002-10644	200208 27
				<--	
PRAI	JP 2001-256150	A	20010827	<--	
	JP 2001-311723	A	20011009	<--	

AB This invention relates to a method of producing a thermistor element, formed mainly of a metal oxide sintered body, and a prodn. app. for producing raw materials for such a thermistor element. The thermistor element can be appropriately used for a thermistor element of a temp. sensor, for an automobile exhaust gas, etc., capable of detecting a temp. from room temp. to a high temp. in the range of .gtoreq.1000.degree .. When producing a ceramic element formed of a sintered metal oxide as a principal, this invention aims to make uniform the compn. of a ceramic raw material and to reduce the variance of the resistance of the ceramic element. A prodn. method of the invention comprises the following steps: prepg. a precursor soln. by mixing a precursor of a metal oxide in a liq. phase, spraying the precursor soln. and obtaining droplet particles, heat-treating the droplet particles and obtaining thermistor raw material powder, and molding and sintering the thermistor raw material powder into a predetd. shape and obtaining a metal oxide sintered body. The method of producing a sintered ceramic element obtained by sintering a metal oxide ceramic raw material includes the following steps: mixing a precursor of a metal oxide in a liq. phase and prepg. a

precursor soln.; spraying the precursor soln. and obtaining droplet particles; heat-treating the droplet particles and obtaining raw material powder of a ceramic element; heat-treating the raw material powder obtained in the 1st heat-treatment step at a temp. higher than the 1st heat-treatment step, which changes the mean particle size of the raw material powder to 0.1-1.0  $\mu\text{m}$ ; and granulating, molding, and sintering the raw material powder obtained in the 2nd heat-treatment step.

IT 1306-38-3, Cerium oxide ( $\text{CeO}_2$ ), reactions  
(method of producing thermistor element, and  
prodn. app. for producing raw materials for  
thermistor element)

RN 1306-38-3 HCA

CN Cerium oxide ( $\text{CeO}_2$ ) (CA INDEX NAME)



IC ICM H01C007-10

INCL 338022000R

CC 76-2 (Electric Phenomena)

Section cross-reference(s): 57

IT 1303-86-2, Boron oxide ( $\text{B}_2\text{O}_3$ ), reactions 1305-78-8, Calcium oxide ( $\text{CaO}$ ), reactions 1306-38-3, Cerium oxide ( $\text{CeO}_2$ ), reactions 1308-38-9, Chromium oxide ( $\text{Cr}_2\text{O}_3$ ), reactions 1308-87-8, Dysprosium oxide ( $\text{Dy}_2\text{O}_3$ ) 1309-37-1, Ferric oxide, reactions 1309-48-4, Magnesium oxide ( $\text{MgO}$ ), reactions 1313-96-8, Niobium oxide ( $\text{Nb}_2\text{O}_5$ ) 1313-97-9, Neodymium oxide ( $\text{Nd}_2\text{O}_3$ ) 1313-99-1, Nickel oxide ( $\text{NiO}$ ), reactions 1314-13-2, Zinc oxide ( $\text{ZnO}$ ), reactions 1314-23-4, Zirconium oxide ( $\text{ZrO}_2$ ), reactions 1314-37-0, Ytterbium oxide ( $\text{Yb}_2\text{O}_3$ ) 1314-61-0, Tantalum oxide ( $\text{Ta}_2\text{O}_5$ ) 1317-34-6, Manganese oxide ( $\text{Mn}_2\text{O}_3$ ) 1317-61-9, Iron oxide ( $\text{Fe}_3\text{O}_4$ ), reactions 1344-28-1, Alumina, reactions 1344-43-0, Manganous oxide, reactions 7631-86-9, Silica, reactions 7789-02-8, Chromium nitrate nonahydrate 10034-94-3, Magnesium silicate ( $\text{Mg}_2\text{SiO}_4$ ) 10101-39-0 12003-86-0, Aluminum yttrium oxide ( $\text{Al}_3\text{Y}_2\text{O}_{12}$ ) 12005-21-9, Aluminum yttrium oxide ( $\text{Al}_5\text{Y}_3\text{O}_{12}$ ) 12024-21-4, Gallium oxide ( $\text{Ga}_2\text{O}_3$ ) 12027-88-2, Yttrium silicate ( $\text{Y}_2\text{SiO}_5$ ) 12032-20-1, Lutetium oxide ( $\text{Lu}_2\text{O}_3$ ) 12036-32-7, Praseodymium oxide ( $\text{Pr}_2\text{O}_3$ ) 12036-41-8, Terbium oxide ( $\text{Tb}_2\text{O}_3$ ) 12036-44-1, Thulium oxide ( $\text{Tm}_2\text{O}_3$ ) 12053-26-8, Magnesium chromate ( $\text{MgCr}_2\text{O}_4$ ) 12055-23-1, Hafnium oxide ( $\text{HfO}_2$ ) 12055-62-8, Holmium oxide ( $\text{Ho}_2\text{O}_3$ ) 12060-08-1, Scandium oxide ( $\text{Sc}_2\text{O}_3$ ) 12060-58-1, Samarium oxide ( $\text{Sm}_2\text{O}_3$ ) 12061-16-4, Erbium oxide ( $\text{Er}_2\text{O}_3$ ) 12064-62-9, Gadolinium oxide ( $\text{Gd}_2\text{O}_3$ ) 12068-51-8, Aluminum magnesium oxide ( $\text{Al}_2\text{MgO}_4$ )



13463-67-7, Titanium dioxide, reactions    13477-34-4, Calcium  
nitrate tetrahydrate    13494-98-9, Yttrium nitrate hexahydrate  
13776-74-4, Magnesium metasilicate (MgSiO<sub>3</sub>)    17141-63-8, Nitric  
acid, manganese(2+) salt, hexahydrate    18282-10-5, Tin oxide (SnO<sub>2</sub>)  
62462-47-9, Europium oxide (Eu<sub>2</sub>O<sub>3</sub>)

(method of producing thermistor element, and  
prodn. app. for producing raw materials for  
thermistor element)

RE.CNT 12        THERE ARE 12 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L43 ANSWER 2 OF 14 HCA COPYRIGHT 2007 ACS on STN

AN 133:304821 HCA Full-text

TI Valence Characteristics and Structural Stabilities of the  
Electrolyte Solid Solutions Ce<sub>1-x</sub>RE<sub>x</sub>O<sub>2-δ</sub> (RE = Eu, Tb) by High  
Temperature and High Pressure

AU Li, Liping; Li, Guangshe; Che, Yulu; Su, Wenhui

CS Department of Physics and Key Laboratory of Inorganic Synthesis and  
Preparative Chemistry, Jilin University, Changchun, 130023, Peop.  
Rep. China

SO Chemistry of Materials (2000), 12(9), 2567-2574  
CODEN: CMATEX; ISSN: 0897-4756

PB American Chemical Society

DT Journal

LA English

AB Solid solns. Ce<sub>1-x</sub>RE<sub>x</sub>O<sub>2-δ</sub> (RE = Eu, Tb) were prepd. by a high-temp.  
and -pressure method. The products were characterized by XRD, TG,  
EPR, XPS, and Mossbauer spectroscopy. XRD data anal. showed that all  
solid solns. crystd. in a single-phase cubic fluorite structure. The  
nonlinear relations between the lattice parameter and dopant content  
for both series of solns. were ascribed to the results of cation  
substitutions and variations of the relative content of O vacancy Vo  
and defect assocns. {RE'CeVo} and {Ce'CeVo}. EPR and XPS measurements  
confirmed the presence of Ce<sup>3+</sup> ions in the solid solns. For the  
solid solns. Ce<sub>1-x</sub>Eu<sub>x</sub>O<sub>2-δ</sub>, all Eu ions are trivalent by XPS and <sup>151</sup>Eu  
Mossbauer measurements. For the solns. Ce<sub>1-x</sub>Tb<sub>x</sub>O<sub>2-δ</sub>, all Tb ions were  
also stabilized in the trivalent state. This result is different  
from that of the counterpart by hydrothermal conditions, in which a  
mixed valence of Tb<sup>3+</sup>/Tb<sup>4+</sup> prevails at a higher dopant content. The  
prepd. solns. Ce<sub>1-x</sub>Tb<sub>x</sub>O<sub>2-δ</sub> were metastable. With increasing temp.,  
they would be destabilized and decomp. into two fluorite phases,  
accompanied by partial oxidn. from Tb<sup>3+</sup> to Tb<sup>4+</sup>. A.c. impedance  
spectroscopy showed primarily bulk conduction for all samples. For  
the solns. Ce<sub>1-x</sub>Eu<sub>x</sub>O<sub>2-δ</sub>, the temp. dependence of the ionic cond. was  
linear within the temp. range measured with activation energies of  
1.05, 0.82, and 0.87 for x = 0.2, 0.38, and 0.5, resp. For the

decompn. product of the solid soln.  $\text{Ce}_{0.71}\text{Tb}_{0.29}\text{O}_{2-\delta}$ , the cond. gave two linear regions with smaller activation energies; i.e., the activation energy was 0.60 eV  $<600^\circ$  and 0.39 eV  $>600^\circ$  degree.. The higher ionic cond. ( $1.1 + 10^{-2}$  S/cm at  $720^\circ$ ) for the decompn. phases of the soln.  $\text{Ce}_{0.71}\text{Tb}_{0.29}\text{O}_{2-\delta}$  was ascribed to an electronic component involved in relation to the presence of the mixed valence of  $\text{Tb}^{3+}/\text{Tb}^{4+}$  and  $\text{Ce}^{3+}/\text{Ce}^{4+}$ .

IT 1306-38-3, Cerium dioxide, reactions  
(reactant for prepn. of cerium europium/terbium oxides)  
RN 1306-38-3 HCA  
CN Cerium oxide ( $\text{CeO}_2$ ) (CA INDEX NAME)



CC 78-2 (Inorganic Chemicals and Reactions)  
Section cross-reference(s): 75, 76  
ST cerium lanthanide oxide prepn structure elec cond; valence cerium lanthanide oxide; terbium cerium oxide prepn structure elec cond; europium cerium oxide prepn structure elec cond  
IT 1306-38-3, Cerium dioxide, reactions 1308-96-9, Europium sesquioxide 12037-01-3, Terbium oxide ( $\text{Tb}_4\text{O}_7$ )  
(reactant for prepn. of cerium europium/terbium oxides)  
RE.CNT 20 THERE ARE 20 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L43 ANSWER 3 OF 14 HCA COPYRIGHT 2007 ACS on STN  
AN 133:77541 HCA Full-text  
TI Microstructural evolution of an  $\text{Al}_{92}\text{Mn}_6\text{Ce}_2$  alloy during mechanical alloying, hot extrusion and heat-treatments  
AU Ji, Y.; Kallio, M.; Tiainen, T.  
CS Institute of Materials Science, Tampere University of Technology, Tampere, FIN-33101, Finland  
SO Scripta Materialia (2000), 42(11), 1017-1023  
CODEN: SCMAF7; ISSN: 1359-6462  
PB Elsevier Science Inc.  
DT Journal  
LA English  
AB The formation of a supersatd. Al-based solid soln. phase in the mech. alloyed (MA) and compacted structures and two new metastable phases in the compacted and subsequently annealed structures are reported. MA of the mixt. of elemental Al, Mn and Ce powders corresponding to the compn.  $\text{Al}_{92}\text{Mn}_6\text{Ce}_2$  led to the formation of a nanocryst. supersatd. solid soln. of fcc Al. Undissolved Ce tended to oxidize and form

CeO<sub>2</sub>. The as-extruded microstructure contg. the supersatd. fcc Al phase and CeO<sub>2</sub> phase was stable below the temp. of 500°. On the elevated temp. exposure of the as-extruded MA powder closely below the temp. of 500°, the equil. Al<sub>6</sub>Mn phase was formed through the decompn. of the supersatd. solid soln. (fcc Al) phase. The annealing at 500 -550° led to the formation of metastable phases in the as-extruded MA powder. CeO<sub>2</sub> particles remained stable in the studied annealing temp. range from 430-630°. They were located on the boundaries of the intermetallic Al<sub>6</sub>Mn phase, which suppressed the growth of the intermetallic Al<sub>6</sub>Mn phase.

IT 1306-38-3, Cerium dioxide,  
formation (nonpreparative)  
(formation of; microstructural evolution of an  
Al<sub>92</sub>Mn<sub>6</sub>Ce<sub>2</sub> alloy during mech. alloying, hot extrusion, and heat  
treatments)  
RN 1306-38-3 HCA  
CN Cerium oxide (CeO<sub>2</sub>) (CA INDEX NAME)



CC 56-8 (Nonferrous Metals and Alloys)  
IT 1306-38-3, Cerium dioxide,  
formation (nonpreparative) 12043-69-5  
(formation of; microstructural evolution of an  
Al<sub>92</sub>Mn<sub>6</sub>Ce<sub>2</sub> alloy during mech. alloying, hot extrusion, and heat  
treatments)

RE.CNT 9 THERE ARE 9 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L43 ANSWER 4 OF 14 HCA COPYRIGHT 2007 ACS on STN  
AN 130:342122 HCA Full-text  
TI Single-Phase PrO<sub>y</sub>-ZrO<sub>2</sub> Materials and Their Oxygen Storage Capacity:  
A Comparison with Single-Phase CeO<sub>2</sub>-ZrO<sub>2</sub>, PrO<sub>y</sub>-CeO<sub>2</sub>, and  
PrO<sub>y</sub>-CeO<sub>2</sub>-ZrO<sub>2</sub> Materials  
AU Narula, C. K.; Haack, L. P.; Chun, W.; Jen, H.-W.; Graham, G. W.  
CS Chemistry Department, Ford Motor Company, Dearborn, MI, 48121, USA  
SO Journal of Physical Chemistry B (1999), 103(18), 3634-3639  
CODEN: JPCBFK; ISSN: 1089-5647  
PB American Chemical Society  
DT Journal  
LA English  
AB High-surface-area PrO<sub>y</sub>-ZrO<sub>2</sub> mixed oxide, crystd. in the cubic  
fluorite structure, is synthesized for the first time as a single-  
phase material over a wide range of compn. by sol-gel processing. X-

ray powder diffraction shows that the material remains single-phase even after thermal treatment in air to 900°. The oxygen storage capacity of PrOy-ZrO2, where praseodymium undergoes Pr3+ ↔ Pr4+ interconversion, is assessed by temp.-programmed redn. with H2. The results show that there is little oxygen storage capacity unless the PrOy concn. exceeds 25 mol %. A comparison of oxygen storage capacity from similarly prepd. single-phase CeO2-ZrO2, PrOy-CeO2, and PrOy-CeO2-ZrO2 materials is presented. Measurements of lattice parameter and reducibility suggest that there are preferred assocns. that lead to PrOy-ZrO2 and CeO2-ZrO2 rather than PrOy-CeO2 in the ternary mixed oxide. An evaluation of model Pd catalysts, using PrOy-ZrO2 and CeO2-ZrO2 as support materials, in functional tests approximating warmed-up, steady -state operation of an automotive catalyst, is also reported.

CC 59-3 (Air Pollution and Industrial Hygiene)

Section cross-reference(s): 51, 67

RE.CNT 19 THERE ARE 19 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L43 ANSWER 5 OF 14 HCA COPYRIGHT 2007 ACS on STN

AN 124:186445 HCA Full-text

TI Formation of the Ce/Y2O3 interface: an in situ XPS study

AU Thromat, N.; Gautier-Soyer, M.; Bordier, G.

CS CEA-Direction des Sciences de la Matiere, Departement de Recherche sur l'Etat Condense, les Atomes et les Molecules, Service de Recherche sur les Surfaces et l'Irradiation de la Matiere, CE-Saclay, 91191, Gif sur Yvette, Fr.

SO Surface Science (1996), 345(3), 290-302

CODEN: SUSCAS; ISSN: 0039-6028

PB North-Holland Physics

DT Journal

LA English

AB We have studied the formation of the Ce/Y2O3 interface by XPS from a Ce vapor deposited onto a polycryst. stoichiometric Y2O3 sample. The substrate temp. ranged between the room temp. and 850°C, which is above the cerium m.p. (795°C). The shape of the Ce3d photoelectron lines shows that even at room temp., an interfacial compd. Ce2O3-x forms over a few at. layers. When the substrate temp. increases, the thickness of this oxidized layer increases. A model based on a diffusion mechanism of oxygen atoms coming from the oxide substrate is proposed to account for the exptl. results.

IT 1345-13-7D, Cerium oxide (Ce2O3), oxygen-deficient  
(formation as interface between Ce deposited and Y2O3  
substrate)

RN 1345-13-7 HCA

CN Cerium oxide (Ce2O3) (CA INDEX NAME)

\*\*\* STRUCTURE DIAGRAM IS NOT AVAILABLE \*\*\*

CC 66-5 (Surface Chemistry and Colloids)  
 Section cross-reference(s): 67, 73

IT Interface  
 (cerium oxide interface formation  
 on Ce deposition on polycryst. Y2O3)

IT 1345-13-7D, Cerium oxide (Ce2O3), oxygen-deficient  
 (formation as interface between Ce deposited and Y2O3  
 substrate)

L43 ANSWER 6 OF 14 HCA COPYRIGHT 2007 ACS on STN  
 AN 120:118093 HCA Full-text  
 TI Thermodynamics and phase equilibrium of Cu-Ce-O, Cu-Ce-O-S liquid  
 solutions  
 AU Du, Ting; Li, Guodong  
 CS Cent. Iron Steel Res. Inst., Minist. Metall. Ind., Beijing, Peop.  
 Rep. China  
 SO Jinshu Xuebao (1993), 29(7), B316-B322  
 CODEN: CHSPA4; ISSN: 0412-1961  
 DT Journal  
 LA Chinese  
 AB Thermodyn. of Cu-Ce-O, Cu-Ce-S and Cu-Ce-O-S solns. at 1200°C were  
 studied by using solid electrolyte cell and chem. equil. method. The  
 equil. consts. of deoxidn., desulfurization and deoxysulfurization by  
 Ce, the Gibbs std. free energies of the formation of Ce2O3, CeS,  
 Ce2O2S in Cu-base soln., activity interaction coeffs. of S and Ce,  
 temp. dependence of std. free energy of soln. of Ce in Cu and the  
 self-interaction coeffs. of Ce in liq. Cu have been obtained. The  
 phase pptn. diagram for Cu-Ce-S-O system has been plotted. The  
 steady thermodyn. condition of the existence of Ce2O3, CeS and Ce2O2S  
 in liq. Cu has been detd.

IT 1345-13-7, Cerium oxide (Ce2O3)  
 (free energy of formation of)

RN 1345-13-7 HCA  
 CN Cerium oxide (Ce2O3) (CA INDEX NAME)  
 \*\*\* STRUCTURE DIAGRAM IS NOT AVAILABLE \*\*\*

CC 69-1 (Thermodynamics, Thermochemistry, and Thermal Properties)  
 IT Free energy  
 (of formation, of cerium oxide  
 sulfide)

IT 1345-13-7, Cerium oxide (Ce2O3) 12014-82-3, Cerium sulfide  
 (CeS) 12442-45-4, Cerium oxide sulfide (Ce2O2S)  
 (free energy of formation of)

L43 ANSWER 7 OF 14 HCA COPYRIGHT 2007 ACS on STN  
 AN 110:157156 HCA Full-text  
 TI Method of preparing ammonia and ammonia synthesis catalysts  
 IN Cirjak, Larry M.; Schmidt, Richard P., Jr.

PA Standard Oil Co., USA  
SO U.S., 7 pp.  
CODEN: USXXAM  
DT Patent  
LA English  
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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PI	US 4789538	A	19881206	US 1987-74736	198707 17

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PRAI US 1987-74736 19870717 <--

AB The title catalysts are prepd. from precursors consisting of lanthanide-promoted Group VII metal cyanide salts of formula  $\text{AyMa}[\text{M}'(\text{CN})\text{c}]\text{b.nH}_2\text{O}$  ( $y = 0-4$ ;  $a = 0.1-4$ ;  $c = 4-6$ ;  $b = 0.1-4$ ;  $n = 0-30$ ;  $A = \text{alkali or alk. earth metal}$ ;  $M = \text{La, Ce, etc.}$ ,  $M' = \text{Group VII metal}$ ). The precursors, which are free of Al and U, are slowly heated under a nonoxidizing atm. to  $275-450^\circ$  for activation, and N and H are passed over the resulting catalysts at high temp. and pressure to give  $\text{NH}_3$ . Thus,  $\text{KCe}[\text{Fe}(\text{CN})_6]$  was prepd. and impregnated onto colloidal  $\text{CeO}_2$  to give a supported catalyst. After activation, a 2:1 mixt. of H and N was passed over the catalyst at  $455^\circ$  and pressure 1500 psi;  $\text{NH}_3$  was formed at 14.55 vol.%, vs. 1.44-4.55 vol.% for Group VII cyanide catalysts which did not include alkali metal promoters.

IT 1306-38-3, Ceria, uses and miscellaneous  
(support, for ammonia synthesis catalysts from  
lanthanide-promoted transition metal cyanide salts)

RN 1306-38-3 HCA

CN Cerium oxide ( $\text{CeO}_2$ ) (CA INDEX NAME)



IC ICM C01C001-04

INCL 423362000

CC 49-8 (Industrial Inorganic Chemicals)

IT 1306-38-3, Ceria, uses and miscellaneous  
(support, for ammonia synthesis catalysts from  
lanthanide-promoted transition metal cyanide salts)

L43 ANSWER 8 OF 14 HCA COPYRIGHT 2007 ACS on STN

AN 103:166830 HCA Full-text

TI Surface chemistry of cerium oxide  
prepared by an isobaric thermal procedure  
AU Fierro, J. L. G.; Mendioroz, S.; Olivan, A. M.  
CS Inst. Catal. Petroleoquim., CSIC, Madrid, 28006, Spain  
SO Journal of Colloid and Interface Science (1985), 107(1),  
60-9  
CODEN: JCISA5; ISSN: 0021-9797  
DT Journal  
LA English  
AB Catalytically active forms of CeO<sub>2</sub> were prepd. by slow thermal  
decompn. of amorphous Ce(OH)<sub>4</sub> at a const. rate and low H<sub>2</sub>O vapor  
pressure (12 N/m<sup>2</sup>). Structural and phase changes accompanying  
thermal decompn. were followed by thermogravimetric anal., x-ray  
diffraction, and SEM. Although the precursors are amorphous, they  
became cryst. at >570 K. Anal. of N<sub>2</sub> adsorption-desorption isotherms  
at 77 K showed that their surface areas are high (50-60 m<sup>2</sup>/g) at low  
temp. but decrease drastically as the sintering temp. increases. The  
presence of both CO<sub>3</sub><sup>2-</sup> and H-linked structures and their evolution  
with increasing temp. under vacuum was investigated by IR  
spectroscopy.  
IT 1306-38-3P, uses and miscellaneous  
(catalysts, prepn. and structure of)  
RN 1306-38-3 HCA  
CN Cerium oxide (CeO<sub>2</sub>) (CA INDEX NAME)



CC 67-1 (Catalysis, Reaction Kinetics, and Inorganic Reaction  
Mechanisms)  
Section cross-reference(s): 78  
IT 1306-38-3P, uses and miscellaneous  
(catalysts, prepn. and structure of)  
L43 ANSWER 9 OF 14 HCA COPYRIGHT 2007 ACS on STN  
AN 93:214560 HCA Full-text  
TI Thermal study of the formation of condensed ceric oxide-ammonium  
dihydrogen phosphates  
AU Vaivada, M.; Konstants, Z.  
CS Inst. Neorg. Khim., Riga, USSR  
SO Term. Anal., Tezisy Dokl. Vses. Soveshch., 7th (1979),  
Volume 1, 123-4. Editor(s): Karlivan, V. P. Publisher: Zinatne,  
Riga, USSR.  
CODEN: 44GVA5  
DT Conference

LA Russian  
AB The reaction products in the  $\text{CeO}_2\text{-NH}_4\text{H}_2\text{PO}_4$  system at 20-600° were studied by DTA, x-ray phase anal., and IR spectra. At a P:Ce ratio >10 cryst. Ce ultraphosphate is formed at 550° during rapid heating whereas at P:Ce ratios <10  $\text{Ce}(\text{PO}_3)_3$  and  $\text{CeP}_2\text{O}_7$  are formed at 300-400° during rapid heating. During slow heating and at a P:Ce ratio >10,  $\text{Ce}(\text{NH}_4)_2(\text{PO}_3)_5$  is formed; at P:Ce >4,  $\text{Ce}(\text{NH}_4)\text{P}_4\text{O}_{12}$  is formed at 300-400°. At >450°  $\text{Ce}(\text{NH}_4)_2(\text{PO}_3)_5$  decompd. to  $\text{Ce}(\text{NH}_4)\text{P}_4\text{O}_{12}$  which decompd. to  $\text{CeP}_5\text{O}_{14}$  at 550°. At 350-400° from mixts. contg. 20-30%  $\text{CeO}_2$ ,  $\text{Ce}(\text{NH}_4)\text{P}_4\text{O}_{12}$  and  $\text{Ce}(\text{PO}_3)_4$  were obtained, the latter of which was reduced at 450° to  $\text{Ce}(\text{PO}_3)_3$ .

CC 78-6 (Inorganic Chemicals and Reactions)

L43 ANSWER 10 OF 14 HCA COPYRIGHT 2007 ACS on STN

AN 73:123199 HCA Full-text

TI Densification and electrical conductivity of hot-pressed  $\text{ZrO}_2\text{-CeO}_2$  mixtures

AU Kose, Saburo; Kinoshita, Makoto; Hamano, Yoshiteru

CS Govt. Ind. Res. Inst., Osaka, Japan

SO Yogyo Kyokaishi (1970), 78(901), 307-18

CODEN: YGKSA4; ISSN: 0009-0255

DT Journal

LA Japanese

AB Hot-pressing of  $\text{ZrO}_2\text{-CeO}_2$  powder mixts. was carried out at temps. ranging from 1400° to 1700° in graphite molds. Pressure of 210 kg/cm<sup>2</sup> was applied throughout the hot-pressing process. Shrinkage of the compact during hot-pressing was measured by a dilatometric method. Bulk d. of the hot-pressed body was measured and the d. change of the compact during hot-pressing was calcd. Densification data for  $\text{ZrO}_2$  compacts without additives were processed with Murray's equation based on plastic flow mechanism. Plots of  $\log(1 - \rho)$  vs. t were divided into 3 parts, that is, initial stage characterized by very rapid densification, intermediate stage in which fairly good linearities were obtained, and final stage characterized by very slow densification. The densification data were also processed with Fryer's equation based on stress enhanced diffusion mechanism. Densification of  $\text{ZrO}_2$  was strongly accelerated by addn. of up to 20 mole %  $\text{CeO}_2$ . The max. relative d. was attained at  $\text{ZrO}_2$  contg. 5 mole %  $\text{CeO}_2$ . X-ray powder diffraction anal. showed that a pyrochlore-type  $\text{Ce}_2\text{Zr}_2\text{O}_7$  was formed by hot-pressing of  $\text{ZrO}_2\text{-CeO}_2$  mixts. in reducing atm., and it was changed easily into tetragonal  $\text{ZrO}_2$  solid soln. by oxidizing at 1500° in air. The elec. cond. of the oxidized specimen was measured in air with Kelvin's double bridge in the temperature range from 500° to 1500°. The cond. at elevated temps. was strongly dependent on the temp. From the elec. cond. data transformation temps. from monoclinic to tetragonal form were lowered by increasing the  $\text{CeO}_2$  content. The max. in cond.



isotherms was attained when ZrO<sub>2</sub> contained 80 mole % of CeO. The cond. in this compn. was  $5.50 + 10^{-5}$  ohm<sup>-1</sup> cm<sup>-1</sup> at 600°,  $3.55 + 10^{-2}$  at 1000°, and 1.15 at 1500°.

CC 57 (Ceramics)

IT 12157-80-1P

(formation of, from cerium oxide  
and zirconium oxide in hot-pressing)

L43 ANSWER 11 OF 14 HCA COPYRIGHT 2007 ACS on STN

AN 71:26861 HCA Full-text

TI Uranium dioxide

PA Associated Electrical Industries Ltd.

SO Fr., 3 pp.

CODEN: FRXXAK

DT Patent

LA French

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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PI	FR 1538877		19680906	FR 1967-121904	196709 22

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GB 1172226

GB

PRAI GB 19660929 <--

AB Structural modification of UO<sub>2</sub> is prevented by adding 0.8-2% CeO<sub>2</sub> thereby reducing escape of dissolved Xe. Thus, uranium oxide powder having the compn. UO<sub>2</sub>·0.4 is mixed with CeO<sub>2</sub> powder into a mortar, poly(Bu methacrylate) is added as a binding agent, and the mixt. is compressed into a matrix under 40 kg./mm.<sup>2</sup> The binding agent is eliminated by slowly heating (400°/hr.) the mixt. to 1750° and keeping it at this temp. during 2 hrs. The product contained about 1% by wt. CeO<sub>2</sub> and had a d. of 10.51 g./cc. with a grain size of about 20 μ. By heating to 1800°, the fraction of degassed xenon was  $4.3 + 10^{-3}$ . Under the same conditions, but without the addn. of CeO<sub>2</sub>, the fraction of degassed xenon was  $13 + 10^{-3}$ .

IT 1306-38-3

(nuclear reactor fuels of uranium oxide contg., for improved fission product retention)

RN 1306-38-3 HCA

CN Cerium oxide (CeO<sub>2</sub>) (CA INDEX NAME)



IC C01G; G21C  
CC 76 (Nuclear Technology)  
IT Nuclear reactor fuels, preparation  
(of uranium oxide contg. cerium oxide for  
fission products retention)  
IT 1306-38-3  
(nuclear reactor fuels of uranium oxide contg., for improved  
fission product retention)

L43 ANSWER 12 OF 14 HCA COPYRIGHT 2007 ACS on STN

AN 65:28146 HCA Full-text

OREF 65:5186f-h,5187a

TI Crucibles of cerium dioxide

AU Ivanov, E. G.; Filippov, A. F.; Min'kov, D. B.; Makarova, T. S.;  
Vinogradova, L. V.

CS Inst. Steel and Alloys, Moscow

SO Ogneupory (1966), 31(5), 27-9

CODEN: OGNPA2; ISSN: 0369-7290

DT Journal

LA Russian

AB For press molding of ceria crucibles, the CeO<sub>2</sub> powder was ground to 5-15 $\mu$  grain size and mixed at 70-90° with 8% org. binder consisting of 95% paraffin and 5% oleic acid. The mass was poured into a steel press mold and compressed under 150-200 kg./cm.<sup>2</sup> The green pieces were slowly preheated to 1200° and sintered at 1500-1600° in an elec. resistance furnace. For slip casting of small (15-28 ml.) lab.-crucibles, the CeO<sub>2</sub> material was wet ground in a steel mill, washed in a concd. HCl soln., and cast in plaster of Paris molds. The crucibles were fired in saggers on MgO grains up to 1750°, with 6-9 hrs. soaking time. Sp. gr. of the fired body was 6.4-6.6 g./cm.<sup>3</sup>, apparent porosity 1%. The press-molded crucibles had a thicker wall and a higher porosity than the slip-cast pieces. The crucibles were used for melting of Ce-Ni and La-Ni alloys contg, up to 12.5% Ce and up to 7.2% La, resp. Max. melting temp. was 1550° held for 30 min. -3 hrs., depending on conditions of the expts. For heat shock protection, the CeO<sub>2</sub> crucibles were placed inside of Al<sub>2</sub>O<sub>3</sub> crucibles. At a slow uniform heating, the CeO<sub>2</sub> crucibles did not crack, and were usable for 3 melting operations. Small addn. of MgO, CaO, or SrO make ceria ceramics more stable under the heat-shock conditions. Ce reduces CeO<sub>2</sub> forming Ce<sub>2</sub>O<sub>3</sub>. This reaction was not apparent with Ce-Ni alloys, probably because of the formation of a thin layer of Ce<sub>2</sub>O<sub>3</sub> at the inner wall of the crucible. A confirmation of that was found in an approx. 10% lesser content of Ce in the fused alloy as compared with the initial batch compns. In Al<sub>2</sub>O<sub>3</sub> crucibles, the Ce content of fused alloys was less than 1/2 of the initial batch concn. Exptl.

La<sub>2</sub>O<sub>3</sub> crucibles (thermo- dynamically nonreducible by Ce) were found to be of a very good chem. stability against Ce alloys. X-ray analysis of Ce-Ni alloys, fused in CeO<sub>2</sub> crucibles, did not reveal the presence of Ce<sub>2</sub>O<sub>3</sub>. The O content in 0.38 % Ce-Ni alloy, fused in a CeO<sub>2</sub> crucible, was 0.001%, identical with that of pure fused Ni itself.

CC 21 (Ceramics)

L43 ANSWER 13 OF 14 HCA COPYRIGHT 2007 ACS on STN

AN 63:69050 HCA Full-text

OREF 63:12664g-h,12665a

TI Thermal decomposition of hydrated chlorides of rare earth elements

AU Haeseler, Guenther; Matthes, Franz

CS Tech. Hochsch. Chem. "Carl Schorlemmer," Leuna-Merseburg, Germany

SO Journal of the Less-Common Metals (1965), 9(2), 133-51

CODEN: JCOMAH; ISSN: 0022-5088

DT Journal

LA German

AB Oxides with a purity of 98.5 to 99.8% were used as starting materials. Thermal dehydration of hydrated rare earth chlorides were studied with an automatic thermobalance at various conditions. By using very low heating rates, accurate results of hydrate decompn. and the formation of oxide compds. were obtained. Thermal decompn. of the hydrated chlorides of La, Pr, and Nd in air gave various hydrates and anhyd. chlorides. The products of the thermal decompn. up to 500° were the oxychlorides; Ce under these conditions formed CeO<sub>2</sub>. With Sm to Lu, the prepn. of the anhyd. chlorides in an air stream was impossible even with extremely slow heating. The decompn. of the monohydrates always gave oxide compds. During the decompn. in a mixt. of air and HCl the following hydrates were found: MCl<sub>3</sub>-xH<sub>2</sub>O (M is rare earth metal) and x = 6, 3.5, 3, 2.5, 2, and 1. The hydrates which were formed by the particular elements varied. In the formation of the oxychlorides from the monohydrates (Sm to Lu) in an air stream the stages were probably M(OH)Cl<sub>2</sub>, MOCl.H<sub>2</sub>O, and MOCl.MCl<sub>3</sub>.2H<sub>2</sub>O. The compd. MOCl.H<sub>2</sub>O [or M(OH)2Cl] is prepd. by hydration in the gas phase and the thermal decompn. of the hydrated product. The formation of the anhyd. trihalides from the oxychlorides or oxides in an HCl stream was studied for some of these elements

CC 14 (Inorganic Chemicals and Reactions)

L43 ANSWER 14 OF 14 HCA COPYRIGHT 2007 ACS on STN

AN 63:68936 HCA Full-text

OREF 63:12643h,12644a

TI Selenides of rare-earth elements. I. Cerium selenide and oxyselenide

AU Obolonchik, V. A.; Mikhлина, T. M.

SO Zhurnal Prikladnoi Khimii (Sankt-Peterburg, Russian Federation) (

1965), 38(7), 1451-6

CODEN: ZPKHAB; ISSN: 0044-4618

DT Journal

LA Russian

AB The prepn. and properties of CeSe and Ce<sub>2</sub>O<sub>2</sub>Se were studied. In O- and N-free Ar the reaction of CeO<sub>2</sub> with Se was negligible at 800-900°. At 1100-1200° almost pure Ce<sub>2</sub>O<sub>2</sub>Se was formed; d. 6.47, sp. resistance of the order of 4 + 10<sup>5</sup> ohm-cm. Increasing the temp. to 1200° slowly or heating in air decompd. it into CeO<sub>2</sub> and Se. But raising the temp. rapidly to 1350° gave CeSe. CeO<sub>2</sub> reacted with H<sub>2</sub>Se at 1100-1200°, 5-6 hrs. to give Ce<sub>2</sub>Se<sub>3</sub>. Heating 2 hrs. at 1100° gave impure CeSe. Heating Ce<sub>2</sub>Se<sub>3</sub> in a current of H or in vacuo gave CeSe and Se.

CC 14 (Inorganic Chemicals and Reactions)

IT 12014-83-4P, Cerium selenide, CeSe 12014-92-5P, Cerium oxide selenide, Ce<sub>2</sub>O<sub>2</sub>Se  
(prepn. and properties of)

=> D L44 1-23 BIB ABS HITSTR HITIND

L44 ANSWER 1 OF 23 HCA COPYRIGHT 2007 ACS on STN

AN 138:6970 HCA Full-text

TI High strength magnesium-based glass matrix composites

AU Bartusch, Birgit; Schurack, Frank; Eckert, Jurgen

CS IFW Dresden, Institute for Metallic Materials, Dresden, D-01171, Germany

SO Materials Transactions (2002), 43(8), 1979-1984

CODEN: MTARCE; ISSN: 1345-9678

PB Japan Institute of Metals

DT Journal

LA English

AB Magnesium-based glass matrix composites contg. oxide particles were produced by mech. alloying of Mg<sub>55</sub>Cu<sub>30</sub>Y<sub>15</sub> elemental powder mixts. with the addn. of MgO, CeO<sub>2</sub>, Cr<sub>2</sub>O<sub>3</sub>, or Y<sub>2</sub>O<sub>3</sub> oxide particles. Formation of the glassy phase was characterized by x-ray diffraction and TEM and was found to proceed almost unaffected by the presence of the oxides. Differential scanning calorimetry revealed that the amorphous matrix features a wide supercooled liq. region with an extension of .apprx.40-50 K. Difference in the thermal stability of the composites depending on the oxide addn. is discussed. Viscosity measurements proved the existence of a characteristic min. of viscosity in this temp. range which was used to consolidate the powders into bulk samples by uniaxial hot pressing. The deformation behavior under compression at room temp. as well as at elevated temp. of 423 K yielded excellent properties compared to conventionally produced magnesium-based alloys.

IT 1306-38-3, Cerium oxide (CeO<sub>2</sub>), properties  
(metal matrix composite constituent; microstructure and mech.  
properties of high strength amorphous magnesium alloy - metal  
oxide composites produced by mech. alloying)

RN 1306-38-3 HCA

CN Cerium oxide (CeO<sub>2</sub>) (CA INDEX NAME)



CC 56-4 (Nonferrous Metals and Alloys)

IT 1306-38-3, Cerium oxide (CeO<sub>2</sub>), properties 1308-38-9,  
Chromium oxide (Cr<sub>2</sub>O<sub>3</sub>), properties 1309-48-4, Magnesium oxide  
(MgO), properties 1314-36-9, Yttrium oxide (Y<sub>2</sub>O<sub>3</sub>), properties  
(metal matrix composite constituent; microstructure and mech.  
properties of high strength amorphous magnesium alloy - metal  
oxide composites produced by mech. alloying)

RE.CNT 28 THERE ARE 28 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L44 ANSWER 2 OF 23 HCA COPYRIGHT 2007 ACS on STN

AN 136:78772 HCA Full-text

TI Hydrothermal synthesis of metal oxide nanoparticles at supercritical  
conditions

AU Adschiri, Tadafumi; Hakuta, Yukiya; Sue, Kiwamu; Arai, Kunio  
CS Department of Chemical Engineering, Tohoku University, Sendai,  
980-8579, Japan

SO Journal of Nanoparticle Research (2001), 3(2-3), 227-235  
CODEN: JNARFA; ISSN: 1388-0764

PB Kluwer Academic Publishers

DT Journal

LA English

AB Hydrothermal synthesis of CeO<sub>2</sub> and AlO(OH) were conducted using a  
flow type app. over the range of temp. from 523 to 673 K at 30 MPa.  
Nanosize crystals were formed at supercrit. conditions. The  
mechanism of nanoparticle formation at supercrit. conditions is  
discussed based on the metal oxide soly. and kinetics of the  
hydrothermal synthesis reaction. The reaction rate of Ce(NO<sub>3</sub>)<sub>3</sub> and  
Al(NO<sub>3</sub>)<sub>3</sub> was evaluated using a flow type reactor. The Arrhenius plot  
of the 1st order rate const. fell on a straight line in the subcrit.  
region, while it deviated from the straight line to the higher values  
above the crit. point. The soly. of Ce(OH)<sub>3</sub> and AlO(OH) was estd. by  
using a modified HKF model in a wide range of pH and temp. In acidic  
conditions, where hydrothermal synthesis reaction is concerned, soly.  
gradually decreased with increasing temp. and then drastically

dropped above the crit. point. The trend of the soly. and the kinetics around the crit. point could be explained by taking account of the dielec. const. effect on the reactions. There are two reasons why nanoparticle are formed at supercrit. conditions. Larger particles are produced at subcrit. conditions due to Ostwald ripening; that could not be obsd. in supercrit. H2O because of the extremely low soly. Second reason is the faster nucleation rate in supercrit. H2O because of the lower soly. and the extremely fast reaction rate.

IT 1306-38-3P, Cerium oxide (CeO2)  
, preparation  
(hydrothermal synthesis of metal oxide nanoparticles at  
supercrit. conditions)  
RN 1306-38-3 HCA  
CN Cerium oxide (CeO2) (CA INDEX NAME)



CC 78-2 (Inorganic Chemicals and Reactions)  
Section cross-reference(s): 67  
ST cerium dioxide nanoparticle hydrothermal  
prepn; aluminum hydroxide oxide nanoparticle hydrothermal  
prepn; kinetics hydrothermal reaction aluminum hydroxide oxide  
cerium dioxide prepn  
IT 1306-38-3P, Cerium oxide (CeO2)  
, preparation 24623-77-6P, Aluminum hydroxide oxide  
(Al(OH)O)  
(hydrothermal synthesis of metal oxide nanoparticles at  
supercrit. conditions)  
RE.CNT 26 THERE ARE 26 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L44 ANSWER 3 OF 23 HCA COPYRIGHT 2007 ACS on STN  
AN 136:62993 HCA Full-text  
TI Synthesis of perovskite-related layered  $\text{AnBnO}_{3n+2}$  = ABOx type  
niobates and titanates and study of their structural, electric and  
magnetic properties  
AU Lichtenberg, F.; Herrnberger, A.; Wiedenmann, K.; Mannhart, J.  
CS Institute of Physics, Center for Electronic Correlations and  
Magnetism, University of Augsburg, Augsburg, D-86135, Germany  
SO Progress in Solid State Chemistry (2001), 29(1-2), 1-70  
CODEN: PSSTAW; ISSN: 0079-6786  
PB Elsevier Science Ltd.  
DT Journal

LA English

AB ABO<sub>x</sub> niobates and titanates belonging to the homologous series AnBnO<sub>3n+2</sub> are a special group of perovskite-related layered materials. These oxides comprise the highest-T<sub>c</sub> ferroelects. such as CaNbO<sub>3.50</sub> and LaTiO<sub>3.50</sub>, as well as thermodynamically stable bulk compds. involving well-ordered stacking sequences of layers with different thickness such as SrNbO<sub>3.45</sub>. An extensive overview on many ABO<sub>x</sub> compns. of the AnBnO<sub>3n+2</sub> family and its properties is presented. The crystal structure type is given by n and can be tuned by adjusting the oxygen content X. The charge carrier concn. of the elec. conducting oxides can be varied by appropriate substitutions at the A or B site. To study the properties of these systems, >150 different compns. were prepd. Most of them were grown by floating zone melting, of which many were fabricated as single crystals with precise control of the oxygen content X. For these cryst. compds., the synthesis, structural, elec. and magnetic features are discussed. Attempts to prep. series members beyond the known structure types n = 4, 4.33, 4.5, 5 and 6 were not successful. For some of the known structures types n, however, pronounced nonstoichiometric homogeneity ranges with respect to the oxygen content X and cation ratio A/B were found. Thus, these systems offer many possibilities to vary the compositional, structural, chem. and phys. properties. Further, measurements of the resistivity as a function of temp. T are reported for crystals of the n = 4 type Sr<sub>0.8</sub>La<sub>0.2</sub>NbO<sub>3.50</sub>, n = 4.5 type Sr<sub>0.96</sub>Ba<sub>0.04</sub>NbO<sub>3.45</sub> and n = 5 types Sr<sub>1-Y</sub>La<sub>Y</sub>NbO<sub>3.41</sub> (Y = 0, 0.035, 0.1), Sr<sub>0.95</sub>NbO<sub>3.37</sub>, CaNbO<sub>3.41</sub> and LaTiO<sub>3.41</sub>. These measurements, which were performed in the temp. range 4 K ≤ T ≤ 290 K and along the a-, b- and c-axis, revealed a highly anisotropic cond. and intricate behavior. In parts of the temp. range, these materials are quasi-1D metals which display temp.-driven metal-semiconductor transitions at lower temps. The niobates and titanates studied represent a new group of quasi-1D metals which are in compositional, structural and electronical proximity to nonconducting layered (anti)ferroelects. Also, measurements of the magnetic susceptibility as a function of temp. are reported for many compds. As a typical property at elevated temps., the magnetic susceptibility rises with increasing temp.

IT 1306-38-3, Cerium oxide (CeO<sub>2</sub>), reactions  
(reactant for prepn. of perovskite-related layered  
AnBnO<sub>3n+2</sub> = ABO<sub>x</sub> type niobates/titanates)

RN 1306-38-3 HCA

CN Cerium oxide (CeO<sub>2</sub>) (CA INDEX NAME)



CC 78-2 (Inorganic Chemicals and Reactions)  
 Section cross-reference(s): 75, 76, 77

IT 471-34-1, Calcium carbonate (CaCO<sub>3</sub>), reactions 513-77-9, Barium carbonate (BaCO<sub>3</sub>) 1306-38-3, Cerium oxide (CeO<sub>2</sub>), reactions 1312-81-8, Lanthanum oxide (La<sub>2</sub>O<sub>3</sub>) 1313-96-8, Niobium oxide (Nb<sub>2</sub>O<sub>5</sub>) 1314-23-4, Zirconium oxide (ZrO<sub>2</sub>), reactions 1314-61-0, Tantalum oxide (Ta<sub>2</sub>O<sub>5</sub>) 1633-05-2, Strontium carbonate (SrCO<sub>3</sub>) 7440-03-1, Niobium, reactions 12137-20-1, Titanium oxide (TiO) 13463-67-7, Titanium oxide (TiO<sub>2</sub>), reactions (reactant for prepn. of perovskite-related layered AnBnO<sub>3n+2</sub> = ABO<sub>x</sub> type niobates/titanates)

RE.CNT 75 THERE ARE 75 CITED REFERENCES AVAILABLE FOR THIS RECORD  
 ALL CITATIONS AVAILABLE IN THE RE FORMAT

L44 ANSWER 4 OF 23 HCA COPYRIGHT 2007 ACS on STN

AN 134:373605 HCA Full-text

TI XANES study on the valence transitions in cerium oxide nanoparticles

AU Zhang, Jing; Wu, Ziyu; Liu, Tao; Hu, Tiandou; Wu, Zhonghua; Xin, Ju

CS Institute of High Energy Physics, Beijing Synchrotron Radiation Facility, Chinese Academy of Sciences, Beijing, 100039, Peop. Rep. China

SO Journal of Synchrotron Radiation (2001), 8(2), 531-532  
 CODEN: JSYRES; ISSN: 0909-0495

PB Munksgaard International Publishers Ltd.

DT Journal

LA English

AB The aim of this work is the detn. of Ce environment and valence state in Ce oxide nanoparticles prepd. by the microemulsion method. X-ray absorption near-edge structure measurements at Ce L3 edge were performed on the nanoparticles as a function of annealing temp., ranging from 298 K to 873 K under air condition. The exptl. results support the conclusion that Ce ion, in the studied systems, is in trivalence state when the annealing temp. is <473 K. As the temp. increases up to 623 K, the XANES spectrum shows the coexistence of Ce<sup>3+</sup> and Ce<sup>4+</sup> states. When the temp. is >623 K, the spectra become identical to that of CeO<sub>2</sub> with a distinct double-peak structure, corresponding to the Ce<sup>4+</sup> state.

IT 1306-38-3DP, Cerium dioxide, oxygen-deficient, properties (XANES study on valence transitions in cerium oxide nanoparticles)

RN 1306-38-3 HCA

CN Cerium oxide (CeO<sub>2</sub>) (CA INDEX NAME)





CC 73-6 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)

IT 1306-38-3DP, Cerium dioxide, oxygen-deficient, properties  
(XANES study on valence transitions in cerium oxide nanoparticles)

RE.CNT 8 THERE ARE 8 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L44 ANSWER 5 OF 23 HCA COPYRIGHT 2007 ACS on STN

AN 133:312518 HCA Full-text

TI Thermal expansion of Gd-doped ceria and reduced ceria

AU Hayashi, H.; Kanoh, M.; Quan, C. J.; Inaba, H.; Wang, S.; Dokiya, M.; Tagawa, H.

CS Faculty of Education, Department of Science Education, Chiba University, Chiba-shi, 263-8522, Japan

SO Solid State Ionics (2000), 132(3,4), 227-233  
CODEN: SSIOD3; ISSN: 0167-2738

PB Elsevier Science B.V.

DT Journal

LA English

AB The thermal expansion coeffs. of CeO<sub>2</sub> and Gd-doped ceria were measured at 100-873 K and those of reduced ceria were measured at 100-323 K. The thermal expansion coeff. of Ce<sub>1-x</sub>Gd<sub>x</sub>O<sub>2-x/2</sub> increased with increasing dopant content. The thermal expansion coeff. of reduced ceria increased with increasing oxygen vacancy content. These thermal expansion increases result from weakening binding energy due to the increase of oxygen vacancies. The thermal expansion coeffs. of CeO<sub>2</sub> and Gd-doped ceria were calcd. theor. and they were in good agreement with exptl. ones except for the higher temp. range.

IT 1306-38-3, Cerium oxide (CeO<sub>2</sub>), processes  
(ceramics; effects of oxygen vacancy formation via redn. and Gd doping on thermal expansion of ceria ceramics)

RN 1306-38-3 HCA

CN Cerium oxide (CeO<sub>2</sub>) (CA INDEX NAME)



CC 57-2 (Ceramics)

Section cross-reference(s): 52, 76

IT 1306-38-3, Cerium oxide (CeO<sub>2</sub>), processes 117655-32-0,  
Cerium gadolinium oxide Ce<sub>0.8</sub>Gd<sub>0.2</sub>O<sub>1.9</sub> 152233-89-1, Cerium  
gadolinium oxide Ce<sub>0.9</sub>Gd<sub>0.1</sub>O<sub>1.95</sub>

(ceramics; effects of oxygen vacancy formation via  
redn. and Gd doping on thermal expansion of ceria ceramics)

RE.CNT 22 THERE ARE 22 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L44 ANSWER 6 OF 23 HCA COPYRIGHT 2007 ACS on STN

AN 132:112445 HCA Full-text

TI Waste incinerator and waste incineration capable of suppressing  
dioxin emission

IN Kajikawa, Osamu; Sato, Tominori

PA Osaka Gas Co., Ltd., Japan

SO Jpn. Kokai Tokkyo Koho, 14 pp.

CODEN: JKXXAF

DT Patent

LA Japanese

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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PI	JP 2000024437	A	20000125	JP 1998-196161	199807 10

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PRAI JP 1998-196161 19980710 <--

AB This incinerator comprises an incineration part for incinerating  
wastes and emitting an incinerator flue gas, a bag filter for  
treating the incinerator flue gas, and a discharge part for  
discharging the incinerator flue gas treated by the bag filter: and  
the bag filter comprises a filter part resistant to heat in a temp.  
range exceeding the dioxin prodn. temp. Waste incineration involves  
steps of incinerating wastes and removing powder dust, e.g. fly  
ashes, from the resultant incinerator flue gas by the bag filter.  
The incinerator may further comprise a catalytic treatment part  
comprising a catalyst support of an activated C fiber, Au as a 1st  
catalytic component, and specified metal oxides as 2nd catalytic  
components. Cl-contg. org. compds. including dioxin precursors and  
dioxins are decompd. and removed by removing dust and fly ash by the  
bag filter at the temp. higher than the dioxin prodn. temp.

IT 1306-38-3, Cerium oxide, uses

(catalyst for oxidn. and decompn.; waste incineration and  
incinerator capable of suppressing dioxin prodn. by  
removing fly ash by bag filter at high temp.)

RN 1306-38-3 HCA

CN Cerium oxide (CeO2) (CA INDEX NAME)



IC ICM B01D046-02  
 ICS B01D051-10; B01D053-86; B01J023-58; B01J023-89; F23G005-44

CC 60-4 (Waste Treatment and Disposal)  
 Section cross-reference(s): 47, 67

IT 1306-38-3, Cerium oxide, uses 1309-37-1, Ferric oxide, uses 1309-48-4, Magnesium oxide, uses 1312-43-2, Indium oxide 1312-81-8, Lanthanum oxide 1313-99-1, Nickel oxide, uses 1314-13-2, Zinc oxide, uses 1314-23-4, Zirconium oxide, uses 1314-36-9, Yttrium oxide, uses 1332-29-2, Tin oxide 1344-28-1, Aluminum oxide, uses 1344-70-3, Copper oxide 7440-57-5, Gold, uses 7631-86-9, Silicon oxide, uses 11098-99-0, Molybdenum oxide 11104-61-3, Cobalt oxide 11129-60-5, Manganese oxide 12627-00-8, Niobium oxide 13463-67-7, Titanium oxide, uses  
 (catalyst for oxidn. and decompn.; waste incineration and incinerator capable of suppressing dioxin prodn. by removing fly ash by bag filter at high temp.)

L44 ANSWER 7 OF 23 HCA COPYRIGHT 2007 ACS on STN

AN 131:340627 HCA Full-text

TI Preparation of ultrafine ceric oxide particles by different methods.  
 I. Sol-gel method

AU Hou, Wenhua; Xu, Lin; Qiu, Jinheng; Guo, Canxiong; Chen, Ligang; Yan, Qijie

CS Department of Chemistry, Nanjing University, Nanjing, 210093, Peop. Rep. China

SO Nanjing Daxue Xuebao, Ziran Kexue (1999), 35(4), 486-490  
 CODEN: NCHPAZ; ISSN: 0469-5097

PB Nanjing Daxue

DT Journal

LA Chinese

AB Ultrafine CeO<sub>2</sub> particles were prep'd. by sol-gel method using citric acid as complexing agent. The influence of prepn. conditions such as molar ratio of Ce<sup>3+</sup> and citric acid; reaction temp., pH value, drying temp. of the gel, calcination temp. and time of xerogel on the particle size and sp. surface area has been studied in detail. XRD, TEM, DTA and BET surface area measurements were used for the sample characterization. It is found that the molar ratio of Ce<sup>3+</sup> and citric acid has a significant effect on the particle size, dispersion state and surface area of CeO<sub>2</sub> sample. As the ligand amt. increases, the product diam. increases and surface area decreases but better homogeneity is obtained. The best Ce<sup>3+</sup>/citric ratio is 1:3. The pH value of the soln. needs to keep <0, otherwise the particle size would be larger than 100 nm and inhomogeneous. Four different reaction temps. (55, 65, 75 and 85°C) were selected to study the

reaction temp. effect on the gel formation. The result shows that homogeneous gel can be formed at  $\leq 65^{\circ}\text{C}$  and the gelation increases with decreasing temp.; the best reaction temp. is  $65^{\circ}\text{C}$ . DTA anal. of the dried gel shows that there are two exothermic peaks at 135 and  $270^{\circ}\text{C}$ , representing the decompn. of  $\text{HNO}_3$  and citric acid, resp. After calcination at  $320^{\circ}\text{C}$  for 2 h, ultrafine dispersed  $\text{CeO}_2$  can be obtained. The particles begin to aggregate at  $>500^{\circ}\text{C}$  and sinter at  $>800^{\circ}\text{C}$ . Calcination time also affects the ultrafine particle size; at  $320^{\circ}\text{C}$  calcined for 8 h, the particles begin to aggregate. XRD spectra shows that after calcination at  $250^{\circ}\text{C}$  characteristic peaks of  $\text{CeO}_2$  occur, and the intensity of these characteristic peaks for  $\text{CeO}_2$  increases with increasing temp. The above results suggest that too high/too low/too long calcination temp./time are not suitable for ultrafine particle prepn. The optimum prepn. conditions are as follows:  $\text{Ce}^{3+}$ /citric acid 1:3, reaction temp.  $65^{\circ}\text{C}$ , pH  $<0$ , gel drying temp.  $65^{\circ}\text{C}$ , calcination temp./time  $320^{\circ}/2$  h. Under these conditions, monodispersed ultrafine  $\text{CeO}_2$  particles with av. particles size 10 nm and surface area 57  $\text{m}^2/\text{g}$  were obtained.

IT 1306-38-3P, Cerium oxide ( $\text{CeO}_2$ ), preparation

(powders; effects of sol-gel process parameters on particle size and sp. surface area of ultrafine  $\text{CeO}_2$  particles)

RN 1306-38-3 HCA

CN Cerium oxide ( $\text{CeO}_2$ ) (CA INDEX NAME)



CC 57-2 (Ceramics)

IT 1306-38-3P, Cerium oxide ( $\text{CeO}_2$ ), preparation

(powders; effects of sol-gel process parameters on particle size and sp. surface area of ultrafine  $\text{CeO}_2$  particles)

L44 ANSWER 8 OF 23 HCA COPYRIGHT 2007 ACS on STN

AN 131:148041 HCA Full-text

TI Process for manufacturing melt-textured volume probes based on samarium barium copper oxide ( $\text{Sm}_1\text{Ba}_2\text{Cu}_3\text{O}_7$ ; Sm-123) high-temperature superconductors

IN Kaiser, Axel; Bornemann, Hans; Burgkhardt, Thomas; Hennig, Wolfgang

PA Forschungszentrum Karlsruhe G.m.b.H., Germany

SO Ger., 6 pp.

CODEN: GWXXAW

DT Patent

LA German

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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PI	DE 19748743	C1	19990819	DE 1997-19748743	19971105

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PRAI DE 1997-19748743 19971105 <--

AB This process, in which the final product contains Sm-123  $\geq 50$  and Sm-211 5-50 and/or Nd-422 0-45 and/or Y-211 0-45 wt.%, comprises (A) prepg. a base mixt. for the greenware using as matrix-forming powder Sm<sub>1.8-1.0</sub>Ba<sub>2-y</sub>Cu<sub>3-z</sub>O<sub>7-x</sub> ( $0 < x < 0.5$ ;  $-0.2 < y < 0.2$ ;  $0.3 < z < 0.3$ ) mixed with Sm<sub>2</sub>O<sub>3</sub> 0-20 and/or Sm<sub>2</sub>BaCuO<sub>5</sub> (Sm-211) 0-50 and/or Y<sub>2</sub>BaCuO<sub>5</sub> (Y-211) 0-45 and/or Nd<sub>4</sub>Ba<sub>2</sub>Cu<sub>2</sub>O<sub>10</sub> (Nd-422) 0-45 wt.%, and, if not already mixed with the starting material, adding as additive PtO<sub>2</sub> or Pt 0.1-1 and/or CeO<sub>2</sub> or Ce 0.1-2 and/or Rh<sub>2</sub>O<sub>3</sub> or Rh 0.005-1 and/or Ag<sub>2</sub>O or AgO 0-6 and/or Yb<sub>2</sub>O<sub>3</sub> 0-2 wt.%, and adding (to max. 17 wt.%) CuO 0-4 and/or BaCuO<sub>x</sub> 0-6 and/or BaO 0-5 and/or CaO 0-2 and/or MgO 0-2 and/or Al<sub>2</sub>O<sub>3</sub> 0-2 and/or BaZrO<sub>3</sub> (or, correspondingly, BaO + ZrO<sub>2</sub>) 0-15 and/or ZrO<sub>2</sub> 0-1 and/or V<sub>2</sub>O<sub>5</sub> 0-1 and/or TiO<sub>2</sub> 0-1 and/or Nb<sub>2</sub>O<sub>5</sub> 0-1 and/or Sb<sub>2</sub>O<sub>3</sub> 0-1 and/or Bi<sub>2</sub>O<sub>3</sub> 0-1 wt.%, using (optionally different) particle sizes in the range of 4 nm to 80  $\mu$ m, (B) homogenizing the mixt. in, e.g., a ball mill, during which a C uptake of  $\leq 0.18$  wt.%, via atm. CO<sub>2</sub> and/or from an org. binder, is allowable, (C) molding and densifying the mixt., and (D) melt-texturizing the greenware by providing a Nd-123, Sm-123, MgO, or corresponding-type seed crystal whose decompn. temp. is higher than the max. temp. of the heat treatment. The greenware is then subjected to a temp. program in which the greenware is heated at 400 degree/h to 800°, further heated at 300 degree/h to Tmax (Tmax is .apprx.1020° at 0 partial pressure 80 Pa, or 1050° at 0 partial pressure 800 Pa), held at Tmax for  $\leq 30$  min, cooled (rapidly) at 500 degree/h to .apprx.980° at 0 partial pressure 800 Pa, or to 960° at 0 partial pressure 80 Pa, cooled (slowly) at 1-2 degree/h to .apprx.880° at 0 partial pressure 800 Pa, or to 885° at 0 partial pressure 80 Pa, further cooled at 60 degree/h to 800°, and cooled to ambient temp. at 300 degree/h. This process can be automated and permits melt-texturizing under vacuum with seed crystals of suitable texture, and provides vol. probes for use in self-stabilizing contact-free magnetic bearings.

IT 1306-38-3, Cerium dioxide, processes  
(compns. contg.; in manuf. of melt-textured vol. probes  
based on barium copper samarium oxide high-temp. superconductors)

RN 1306-38-3 HCA

CN Cerium oxide (CeO<sub>2</sub>) (CA INDEX NAME)



IC ICM C04B035-45  
ICS C04B035-50  
CC 57-2 (Ceramics)  
Section cross-reference(s): 49, 76  
IT 1301-96-8, Silver oxide (AgO) 1304-28-5, Barium oxide, processes  
1304-76-3, Bismuth oxide, processes 1306-38-3, Cerium  
dioxide, processes 1309-48-4, Magnesia, processes 1309-64-4,  
Antimony trioxide, processes 1313-96-8, Niobium pentoxide  
1314-23-4, Zirconia, processes 1314-37-0, Ytterbium oxide  
1314-62-1, Vanadium pentoxide, processes 1317-38-0, Cupric oxide,  
processes 1344-28-1, Aluminum oxide (Al<sub>2</sub>O<sub>3</sub>), processes  
7440-06-4, Platinum, processes 7440-16-6, Rhodium, processes  
7440-45-1, Cerium, processes 11129-89-8, Platinum oxide  
12009-21-1, Barium zirconium oxide 12060-58-1, Samarium oxide  
12680-36-3, Rhodium oxide 13463-67-7, Titania, processes  
20667-12-3, Silver oxide (Ag<sub>2</sub>O) 57348-59-1, Barium copper oxide  
82642-05-5, Barium copper samarium oxide (BaCuSm<sub>2</sub>O<sub>5</sub>) 82642-06-6,  
Barium copper yttrium oxide (BaCuY<sub>2</sub>O<sub>5</sub>) 90804-74-3, Barium copper  
neodymium oxide (BaCuNd<sub>2</sub>O<sub>5</sub>) 236108-66-0, Barium copper samarium  
oxide (Ba<sub>1.8</sub>-2.2Cu<sub>2.7</sub>-3.3Sm<sub>1</sub>-1.8O<sub>6.5</sub>-7)  
(comps. contg.; in manuf. of melt-textured vol. probes  
based on barium copper samarium oxide high-temp. superconductors)  
RE.CNT 2 THERE ARE 2 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L44 ANSWER 9 OF 23 HCA COPYRIGHT 2007 ACS on STN  
AN 119:144966 HCA Full-text  
TI Hydrothermal synthesis and sintering of ultrafine ceria powders  
AU Zhou, Y. C.; Rahaman, M. N.  
CS Inst. Met. Res., Acad. Sin., Shenyang, 110015, Peop. Rep. China  
SO Journal of Materials Research (1993), 8(7), 1680-6  
CODEN: JMREEE; ISSN: 0884-2914  
DT Journal  
LA English  
AB Undoped CeO<sub>2</sub> and Y<sub>2</sub>O<sub>3</sub>-doped CeO<sub>2</sub> powders of size 10-15 nm were prepd.  
under hydrothermal conditions (10 MPa at 300.degree . for 4 h). The  
compacted powders were sintered freely in air or in O<sub>2</sub> at const.  
heating rates of 1-10 °/min up to 1350°. The undoped CeO<sub>2</sub> started to  
sinter at 800- 900° and reached a max. d. of 95% at 1200°, after  
which the d. decreased slightly. Isothermal sintering at 1150°  
produced a sample with a relative d. of ≈0.98 and an av. grain size  
of ≈100 nm. The samples sintered above 1200° exhibited

microcracking. The decrease in d. and the microcracking above 1200. degree. are attributed to a redox reaction leading to the formation of oxygen vacancies and the evoln. of O2 gas. Doping with Y2O3 produced an increase in the temp. at which measurable sintering commenced and an increase in the sintering rate, compared with the undoped CeO2. Sintered samples of the doped CeO2 showed no microcracks. The CeO2 doped with up to 3 mol% Y2O3 was sintered to almost full d. and with a grain size of  $\approx 200$  nm at 1400°.

IT 1306-38-3, Cerium dioxide, miscellaneous  
(hydrothermal synthesis and sintering of)  
RN 1306-38-3 HCA  
CN Cerium oxide (CeO2) (CA INDEX NAME)



CC 57-2 (Ceramics)  
Section cross-reference(s): 49  
IT 1306-38-3, Cerium dioxide, miscellaneous  
(hydrothermal synthesis and sintering of)

L44 ANSWER 10 OF 23 HCA COPYRIGHT 2007 ACS on STN

AN 117:54296 HCA Full-text

TI On the sintering behavior of 12 mol% ceria-stabilized zirconia

AU Annamalai, V. E.; Gokularathnam, C. V.; Krishnamurthy, R.

CS Dep. Met. Eng., Indian Inst. Technol., Madras, 600 036, India

SO Journal of Materials Science Letters (1992), 11(10), 642-4

CODEN: JMSLD5; ISSN: 0261-8028

DT Journal

LA English

AB The sintering of 12 mol% CeO2-stabilized ZrO2 was studied to ascertain the exact sintering schedule, with well-defined heating and cooling rates, that can develop a fully tetragonal structure. A single-phase 100% tetragonal structure was obtained by sintering at 1350° for 2 h. From this temp., air-quenching can result in a higher d. Sintering at higher temps. leads to a mixed monoclinic-tetragonal structure. The higher the temp. the greater the amt. of monoclinic phase. When sintered at 1600° for 12 h, the CeO2-ZrO2 turns amorphous. This amorphous zirconia can be converted to 100% tetragonal phase by heat treatment at 400° for 2 h and then quenching in air.

IT 1306-38-3, Ceria, uses  
(zirconia ceramics stabilized by, sintering of, tetragonal phase formation in)  
RN 1306-38-3 HCA

CN Cerium oxide (CeO2) (CA INDEX NAME)



CC 57-2 (Ceramics)

IT 1306-38-3, Ceria, uses

(zirconia ceramics stabilized by, sintering of, tetragonal phase formation in)

L44 ANSWER 11 OF 23 HCA COPYRIGHT 2007 ACS on STN

AN 110:197652 HCA Full-text

TI Manufacture of formed parts from brittle materials

IN Nickl, Julius J.

PA Fed. Rep. Ger.

SO Ger. Offen., 4 pp.

CODEN: GWXXBX

DT Patent

LA German

FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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PI	DE 3726037	A1	19890216	DE 1987-3726037
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198708  
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PRAI DE 1987-3726037 19870805 <--

AB Wires, bands, or tubes from metal borides, carbides, oxides, or sulfides for use in electronics and for manuf. of composites are prepd. by alloying appropriate metals and/or their master alloys (via melting or powder metallurgy); forming them into desired shape; complete or partial boriding, carburizing, oxidizing, and/or sulfiding the formed parts; and encasing or impregnating them with metals or by extruding a paste of the brittle materials and esp. oxides with  $\geq 1$  fine wire, strengthening at higher temp., and by encasing or impregnating with metals. A paste of BaO, CeO<sub>2</sub>, and TiO<sub>2</sub> contg. .apprx.0.1% CuO was extruded with a Ni or Cu core and heated at 800° in H to obtain a solid and strong oxide wire. The strengthening oxides and sulfides comprise oxides and sulfides, which are reducible with H at .ltorsim.1000.degree ..

IT 1306-38-3, Cerium dioxide, uses and miscellaneous

(manuf. of formed parts contg., for

composites and electronics)

RN 1306-38-3 HCA



CN Cerium oxide (CeO2) (CA INDEX NAME)



IC ICM C23F017-00  
ICS C04B035-00; H05K003-10; H01B012-00  
ICA C04B035-02; C04B035-46; C04B035-52; C04B035-58  
CC 56-4 (Nonferrous Metals and Alloys)  
Section cross-reference(s): 57, 76  
IT 1304-28-5, Barium oxide, uses and miscellaneous 1306-38-3,  
Cerium dioxide, uses and miscellaneous 13463-67-7, Titanium  
dioxide, uses and miscellaneous  
(manuf. of formed parts contg., for  
composites and electronics)

L44 ANSWER 12 OF 23 HCA COPYRIGHT 2007 ACS on STN  
AN 110:10654 HCA Full-text  
TI High-surface area ceric oxide and its manufacture  
IN David, Claire; Magnier, Claude; Latourrette, Bertrand  
PA Rhone-Poulenc Chimie SA, Fr.; Rhone-Poulenc Chimie de Base  
SO Fr. Demande, 20 pp.  
CODEN: FRXXBL

DT Patent  
LA French

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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PI	FR 2608583	A1	19880624	FR 1986-17805	198612 19
				<--	
	FR 2608583	B1	19901207		
	EP 275733	A1	19880727	EP 1987-402794	198712 09
				<--	
	EP 275733	B1	19910925		
	R: AT, BE, CH, DE, ES, FR, GB, GR, IT, LI, LU, NL, SE				
	AT 67746	T	19911015	AT 1987-402794	198712 09
				<--	
	AU 8782803	A	19880623	AU 1987-82803	

198712  
18

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AU 600061                    B2      19900802  
BR 8706916                   A      19880726      BR 1987-6916

198712  
18

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JP 63239109                   A      19881005      JP 1987-319118

198712  
18

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CA 1323359                   C      19931019      CA 1987-554822

198712  
18

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US 4859432                   A      19890822      US 1987-135380

198712  
21

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PRAI FR 1986-17805           A      19861219      <--  
EP 1987-402794              A      19871209      <--

AB      The title CeO<sub>2</sub>, having surface area of  $\geq 100$  m<sup>2</sup>/g after calcination at 350-450°, has pore vol.  $\geq 0.30$  cm<sup>3</sup>/g and pore diam.  $> 50$  Å. The CeO<sub>2</sub> is prepd. from Ce hydroxide by reacting a Ce salt with a strong base in the presence of carboxylate ions, or by reacting a Ce carboxylate with a strong base, and sepg., washing, and heat-treating the resulting ppt. This CeO<sub>2</sub> is useful as a catalyst for the manuf. of MeOH or in the treatment of waste gases. Thus, 1000 cm<sup>3</sup> 4.25 N aq. soda soln. was fed into a jacketed reactor, and a mixt. of 175 cm<sup>3</sup> aq. soln. of Ce nitrate (2.85 mol/L) and 150 g 17.5 N HOAc was added over 20 min under stirring. The temp. was raised to 90° and maintained at 90. degree. for 3 h. After cooling, 38 cm<sup>3</sup> oxygenated water (9.8 mol/L) was added to the resultant Ce hydroxide slurry, and the mixt. was stirred at 70° for .apprx.1 h. After filtration, the ppt. was twice reslurried in water 100 g/L, and a 3rd time in HNO<sub>3</sub> of pH 3. The ppt. was then filtered off, and dried at 100° for 24 h to give 89 g product contg. 92% CeO<sub>2</sub> that was calcined at 400° for 6 h to give a product having crystal diam. 45 Å, Brunauer-Emmet-Teller surface area .apprx.145 m<sup>2</sup>/g, pore vol. for pores of  $< 1000$  Å 0.42, and of pores  $< 200$  Å, 0.32 g/cm<sup>3</sup>, pore diam. 20-1000 Å, and residual Na content 0.16%.

IT      1306-38-3P, Cerium dioxide,  
preparation

(prepn. of high-surface area, for catalysts)

RN      1306-38-3      HCA

CN Cerium oxide (CeO2) (CA INDEX NAME)



IC ICM C01F017-00  
ICS B01J023-10; B01J035-00  
CC 49-3 (Industrial Inorganic Chemicals)  
Section cross-reference(s): 23, 45, 67  
IT Catalysts and Catalysis  
(cerium dioxide, prepn. of  
high-surface area, for methanol synthesis)  
IT 7732-18-5, Water, properties  
(oxygenated, in high-surface area cerium  
dioxide manuf.)  
IT 37382-23-3  
(pptn. of, in presence of carboxylate ions, in high-surface area  
cerium dioxide manuf.)  
IT 1306-38-3P, Cerium dioxide,  
preparation  
(prepn. of high-surface area, for catalysts)  
IT 17309-53-4  
(reaction of, with alkali, in presence of carboxylate ions, in  
high-surface area cerium dioxide  
manuf.)  
IT 537-00-8, Cerium(III) acetate 14536-00-6 56797-01-4 68084-49-1  
(reaction of, with strong alkali, in high-surface area  
cerium dioxide manuf.)  
IT 64-17-5, Ethanol, properties 67-56-1, Methanol, properties  
67-63-0, Isopropanol, properties 67-64-1, Acetone, properties  
71-23-8, Propanol, properties  
(solvent, in high-surface area cerium dioxide  
manuf.)

L44 ANSWER 13 OF 23 HCA COPYRIGHT 2007 ACS on STN

AN 108:158825 HCA Full-text

TI Activated rare earth borate, x-ray intensifying phosphors, their  
preparation, and x-ray intensifying screens using them

IN Page, Catherine Jo

PA du Pont de Nemours, E. I., and Co., USA

SO Eur. Pat. Appl., 9 pp.

CODEN: EPXXDW

DT Patent

LA English

FAN.CNT 1

	PATENT NO. -----	KIND ----	DATE -----	APPLICATION NO. -----	DATE
PI	EP 256535	A1	19880224	EP 1987-111792	198708 14
				<--	
	EP 256535	B1	19900919		
	R: BE, CH, DE, FR, GB, LI, LU, NL				
	JP 63048387	A	19880301	JP 1987-201976	198708 14
				<--	
	JP 03002473	B	19910116		
	US 4883970	A	19891128	US 1988-284424	198812 14
				<--	
PRAI	US 1986-897040	A	19860815	<--	
	US 1987-95229	A3	19870911	<--	
AB	<p>The title phosphors comprise Gd1-xB03:Cex (x = 0.001-0.09). A mixt. of Gd2O3 68.540, CeO2 0.660, B2O3 13.306, NaCl 26.420, and Na2B4O7 14.446 g was prepd., placed in an Al2O3 crucible, and put into an oven where the temp. was increased at 10°/min until a temp. of 900° was reached. The temp. was maintained at 900.degree . for 12 h and then lowered at 4°/min, after which the resulting powder was dissolved and washed in boiled, distd. H2O under N2 to remove the flux. The material was then vacuum-dried at 50°, sieved through a 325 mesh screen, dispersed in a conventional x-ray screen binder, coated onto a support at a dry coating thickness of 0.25 mm, and covered with a conventional topcoat to produce an x-ray screen. Exposures were then made using a conventional fine grain blue-sensitive medical x-ray film used in mammog. The screen was somewhat slower than a com. DuPont Quanta III x-ray screen; however it showed a decrease in noise of .apprx.5% and an increase of &gt;40% in resolu. in comparison to the Quanta III screen.</p>				
IT	1306-38-3, Cerium oxide (CeO2), uses and miscellaneous (in prepn. of cerium-activated gadolinium borate phosphors)				
RN	1306-38-3 HCA				
CN	Cerium oxide (CeO2) (CA INDEX NAME)				



IC ICM C09K011-78  
ICS G21K004-00  
CC 73-5 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)  
Section cross-reference(s): 8, 74  
IT 1303-86-2, Boron oxide (B2O3), uses and miscellaneous  
1306-38-3, Cerium oxide (CeO2), uses and miscellaneous  
12292-85-2, Gadolinium oxide (GdO3)  
(in prepn. of cerium-activated gadolinium borate phosphors)

L44 ANSWER 14 OF 23 HCA COPYRIGHT 2007 ACS on STN

AN 106:142865 HCA Full-text

TI Compositions for, and manufacture and properties of, high-density sintered aluminum nitride

IN Taniguchi, Hitofumi; Kuramoto, Nobuyuki

PA Tokuyama Soda Co., Ltd., Japan

SO Ger. Offen., 18 pp.

CODEN: GWXXBX

DT Patent

LA German

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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PI	DE 3627317	A1	19870219	DE 1986-3627317	198608 12
				<--	
	DE 3627317	C2	19890420		
	JP 62041766	A	19870223	JP 1985-176865	198508 13
				<--	
	JP 05069793	B	19931001		
	JP 62105960	A	19870516	JP 1985-241348	198510 30
				<--	
	JP 05017190	B	19930308		
	JP 62108774	A	19870520	JP 1985-248797	198511 08
				<--	
	JP 05035109	B	19930525		
	JP 62108775	A	19870520	JP 1985-248798	198511

08

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JP 04060078 B 19920925  
 CA 1262149 A1 19891003 CA 1986-515762

198608  
 12

&lt;--

GB 2179677 A 19870311 GB 1986-19705

198608  
 13

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GB 2179677 B 19900530  
 GB 2213500 A 19890816 GB 1989-4805

198903  
 02

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GB 2213500 B 19900530  
 US 5063183 A 19911105 US 1990-569369

199008  
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PRAI JP 1985-176865 A 19850813 <--  
 JP 1985-241348 A 19851030 <--  
 JP 1985-248797 A 19851108 <--  
 JP 1985-248798 A 19851108 <--  
 US 1986-894256 B1 19860807 <--  
 GB 1986-19705 A3 19860813 <--

AB High-d., sintered AlN is prepd. from finely powd. mixts. of AlN and sintering aids consisting of a halide and a non-halide compd. of rare earth metals, alk. earth metals, and Y. Preferred halogen-free alk. earth compds. are alk. earth aluminates. Powd. Y<sub>2</sub>O<sub>3</sub> 0.7, and CaF<sub>2</sub> 1.3 wt.% were mixed in EtOH with AlN powder with av. diam. 1.42  $\mu$ , contg. 97 wt.% of particles <3  $\mu$ , and with a compn. as presented. The mixt. was dried, and 1.0 g was axially pressed at 200 kg/cm<sup>2</sup> in a 15-mm inside diam. form, and isostatically pressed at 1500 kg/cm<sup>2</sup> to form greenware with a d. of 1.60 g/cm<sup>3</sup>. The temp. was raised to 1100.degree. in 40 min in N, and to 1800 at 15°/min and kept at 1800.degree. for 10 h. The d. of the sintered ware was 3.25 g/cm<sup>3</sup>. The thermal cond. of 3-mm-thick disks was 195 vs. 134 W/m.K for a conventional disk. The O content was 0.09, and 0.56 wt.%, resp. The light transparency of a 0.5 mm thick disk was measured with light of 6  $\mu$  wavelength and was 38%, vs. 29%, resp.

IT 1306-38-3, Ceria, uses and miscellaneous  
 (sintering aids, for high-d. aluminum nitride manuf.)

RN 1306-38-3 HCA

CN Cerium oxide (CeO<sub>2</sub>) (CA INDEX NAME)

O==Ce==O

IC ICM C04B035-58  
ICS C04B035-64; C01B021-072; B22F003-10; C22C029-16  
ICA H01L023-14  
CC 57-2 (Ceramics)  
IT 471-34-1, Calcium carbonate, uses and miscellaneous 563-72-4  
1304-28-5, Barium oxide, uses and miscellaneous 1305-78-8, Calcia,  
uses and miscellaneous 1306-38-3, Ceria, uses and  
miscellaneous 1312-81-8 1314-11-0, Strontia, uses and  
miscellaneous 1314-36-9, Yttria, uses and miscellaneous  
7783-48-4, Strontium fluoride 7789-41-5, Calcium bromide  
7789-75-5, Calcium fluoride, uses and miscellaneous 10124-37-5,  
Calcium nitrate 10476-86-5, Strontium iodide 10553-31-8, Barium  
bromide 12004-05-6 12004-40-9 12004-88-5 12005-26-4  
12005-57-1 12042-68-1 12042-78-3, Calcium aluminate (Al<sub>2</sub>Ca<sub>3</sub>O<sub>6</sub>)  
12060-58-1, Samarium oxide (Sm<sub>2</sub>O<sub>3</sub>) 13536-79-3, Lanthanum bromide  
13709-38-1 13709-49-4, Yttrium fluoride 13718-50-8, Barium  
iodide 13813-25-7 37317-01-4, Cerium fluoride  
(sintering aids, for high-d. aluminum nitride manuf.)

L44 ANSWER 15 OF 23 HCA COPYRIGHT 2007 ACS on STN  
AN 106:104236 HCA Full-text  
TI Hydrogenation of carboxylic acid esters to alcohols  
IN Williams, Peter Sefton  
PA BP Chemicals Ltd., UK  
SO Eur. Pat. Appl., 17 pp.  
CODEN: EPXXDW  
DT Patent  
LA English  
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
	-----	----	-----	-----	
PI	EP 210795	A1	19870204	EP 1986-305527	198607 17
				<--	
	EP 210795	B1	19900502		
	R: AT, BE, DE, FR, GB, IT, LU, NL, SE				
	AT 53828	T	19900615	AT 1986-305527	198607 17
				<--	

AU 8660376                      A            19870129            AU 1986-60376

198607  
21

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AU 596980                      B2            19900524  
CN 86105765                      A            19870128            CN 1986-105765

198607  
23

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JP 62063533                      A            19870320            JP 1986-173533

198607  
23

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PRAI GB 1985-18576                      A            19850723            <--  
EP 1986-305527                      A            19860717            <--

AB    Alcs. are prepd. by the hydrogenation of a carboxylate ester at elevated temps. and atm. or elevated pressure in the presence of a reductively activated CuaM1M2bAcOx (A = alkali metal; M1 = Mg, lanthanide metal, actinide metal; M2 = Ca, Mo, Rh, Mn, Pt, Cr, Zn, Al, Ti, V, Ru, Re, Pd, Ag, Au; a = 0.1-4; b = 0-1.0; c = 0-0.5; x = no. which satisfies valence requirements of the other elements for O) catalyst. Cu(NO3)2.2.5H2O, 3.8 g, was dissolved in 25 mL H2O then added to 5 g MgO (BET surface area 31 m2/g) wetted with 10 mL H2O. After standing for 17 h the water was removed, the recovered solid dried overnight at 110° in vacuo, the dried material calcined in air at 550° for 17 h at GHSV 2000, cooled, purged with N, heated under H to 220° over 2 h, then held at 220. degree. for 2 h. The catalyst was then cooled under H prior to passivation using N contg. trace amts. of O. EtOAc, 90.0 g, and 0.5 g of the catalyst were charged into an autoclave, the autoclave pressurized with H and operated at 230°/40 bars-gage for 12 h, then cooled, and the reactor contents analyzed by gas liq. chromatog. indicating the formation of EtOH in 99% selectivity with 1.24 g/g-catalyst-h EtOH productivity.

IT    1306-38-3, Cerium dioxide, uses and miscellaneous  
      (catalysts, for hydrogenation of C1-24 carboxylate esters in alc.  
      manuf.)

RN    1306-38-3    HCA

CN    Cerium oxide (CeO2)    (CA INDEX NAME)



IC    ICM    C07C029-136

ICS    C07C031-08; B01J023-76

CC    45-4 (Industrial Organic Chemicals, Leather, Fats, and Waxes)



Section cross-reference(s): 23, 67

IT 1306-38-3, Cerium dioxide, uses and miscellaneous  
1309-48-4, Magnesium oxide, uses and miscellaneous 3251-23-8,  
Copper (II) nitrate 13823-29-5, Thorium nitrate  
(catalysts, for hydrogenation of C1-24 carboxylate esters in alc.  
manuf.)

L44 ANSWER 16 OF 23 HCA COPYRIGHT 2007 ACS on STN

AN 97:186971 HCA Full-text

TI Sintering studies on zirconia-ceria system for MHD electrodes

AU Roy, S. K.; Prasad, Ram; Rao, S. V. K.

CS Metall. Div., Bhabha At. Res. Cent., Bombay, 400 085, India

SO Proc. Symp. Sintering Sintered Prod. (1980), Meeting Date

1979, 261-9. Editor(s): Moorthy, V. K. Publisher: India Dep. Atomic  
Energy, Bombay, India.

CODEN: 48JYAN

DT Conference

LA English

AB The powder prepn., sintering, and properties of ZrO<sub>2</sub>-CeO<sub>2</sub> solid soln.  
ceramics contg. 85 ZrO<sub>2</sub> and 15 mol.% CeO<sub>2</sub> was studied in relation to  
their use as electrodes in MHD ducts. The effect of 5 mol.% Y<sub>2</sub>O<sub>3</sub> on  
densification and stabilization was investigated. In the ZrO<sub>2</sub>-CeO<sub>2</sub>  
system tetragonal solid soln. formation was virtually completed at  
1250° after a sufficient time. Addn. of Y<sub>2</sub>O<sub>3</sub> enhanced the rate of  
solid soln. formation and also helped stabilization of the cubic  
phase. Increased thermal treatments, i.e., higher temps. or longer  
times, decreased the elec. cond. Ceramics contg. 85 ZrO<sub>2</sub> and 15  
mol.% CeO<sub>2</sub> had bulk d., porosity, and elec. cond. of 5.14-6.10 g/cm<sup>3</sup>,  
16.73-0%, and 0.96-0.038 + 10<sup>-6</sup>/Ω-cm after sintering at 1250-1500.  
degree. for 5 h and 5.97-6.14 g/cm<sup>3</sup>, 2.52-0%, and 0.032-0.021 + 10<sup>-6</sup>  
/Ω-cm after sintering at 1250-1400. degree. for 24 h, resp. Values  
for ceramics contg. 5 mol.% Y<sub>2</sub>O<sub>3</sub> are also given.

IT 1306-38-3D, solid solns. with zirconia

(ceramics, for electrodes in MHD ducts, prepn. and  
sintering and properties in relation to)

RN 1306-38-3 HCA

CN Cerium oxide (CeO<sub>2</sub>) (CA INDEX NAME)



CC 57-6 (Ceramics)

IT Electric generators

(MHD, electrodes in ducts of, zirconia-cerium  
oxide ceramics for, prepn. and sintering and

properties in relation to)  
 IT 1306-38-3D, solid solns. with zirconia 1314-23-4D, solid  
 solns. with cerium oxide  
 (ceramics, for electrodes in MHD ducts, prepn. and  
 sintering and properties in relation to)

L44 ANSWER 17 OF 23 HCA COPYRIGHT 2007 ACS on STN  
 AN 97:77528 HCA Full-text  
 TI Nonfused aluminum oxide-based abrasive mineral  
 IN Leitheiser, Melvin A.; Sowman, Harold G.  
 PA Minnesota Mining and Manufacturing Co., USA  
 SO U.S., 19 pp. Cont.-in-part of U.S. Ser. No. 53,347, abandoned.  
 CODEN: USXXAM  
 DT Patent  
 LA English  
 FAN.CNT 2

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
	-----	----	-----	-----	
PI	US 4314827	A	19820209	US 1980-145383	198005 13
				<--	
	EP 24099	A1	19810225	EP 1980-302029	198006 16
				<--	
	EP 24099	B1	19840125		
	R: AT, BE, CH, DE, FR, GB, IT, NL, SE				
	CA 1145563	A1	19830503	CA 1980-354117	198006 16
				<--	
	AT 5973	T	19840215	AT 1980-302029	198006 16
				<--	
	NO 8001914	A	19801230	NO 1980-1914	198006 26
				<--	
	NO 150283	B	19840612		
	NO 150283	C	19840919		
	AU 8059712	A	19810108	AU 1980-59712	198006 27
				<--	

AU 538326	B2	19840809			
BR 8004062	A	19810121	BR 1980-4062		
					198006 27
			<--		
JP 56032369	A	19810401	JP 1980-87704		
					198006 27
			<--		
JP 01054300	B	19891117			
ZA 8003883	A	19810729	ZA 1980-3883		
					198006 27
			<--		
US 4518397	A	19850521	US 1983-495179		
					198305 17
			<--		
PRAI US 1979-53347	A2	19790629	<--		
US 1980-145383	A	19800513	<--		
EP 1980-302029	A	19800616	<--		
US 1981-311381	A1	19811014	<--		
AB	<p>The prepn. of synthetic nonfused Al<sub>2</sub>O<sub>3</sub>-based abrasives having a microcryst. structure of randomly oriented crystallites comprising a dominant continuous <math>\alpha</math>-Al<sub>2</sub>O<sub>3</sub> phase with a 2nd phase contg. 1-45 ZrO<sub>2</sub> and/or HfO<sub>2</sub> or <math>\geq 1\%</math> spinel and the prepn. of abrasive articles from them are described. Thus, to a dispersion of 16 N HNO<sub>3</sub> and <math>\alpha</math>-Al<sub>2</sub>O<sub>3</sub> was added 50% aq. zirconyl acetate soln., the mixt. blended, gelled, and the gel dried at 90° to consist of granules <math>\leq 0.5</math> cm diam. contg. &lt;10% volatiles. The granules were crushed and the particles of av. diam. 0.5-5 mm retained for firing. The screened material was fired in an oxidizing atm. to 550° at 100°/h, maintained at 550 for 20 h, the temp. increased to 1350 at 200°/h, and maintained at 1350° for 5 h. The product, after cooling, consisted of opaque white granules contg. 60 Al<sub>2</sub>O<sub>3</sub> and 40% ZrO<sub>2</sub> which had Knoop hardness (500 g load) of 85 and in grinding tests on steel removed 0.137, 0.546, and 0.864 cm<sup>3</sup> metal/cm<sup>2</sup> coated abrasive wear path for abrasive grades 175, 450, and 150 <math>\mu</math> av. diam., resp.</p>				
IT	1306-38-3, uses and miscellaneous				
	(alumina abrasives contg., synthesis and properties of)				
RN	1306-38-3 HCA				
CN	Cerium oxide (CeO <sub>2</sub> ) (CA INDEX NAME)				



IC C04B035-10  
 INCL 051298000  
 CC 57-7 (Ceramics)  
 IT 1306-38-3, uses and miscellaneous 1307-96-6, uses and  
 miscellaneous 1309-48-4, uses and miscellaneous 1313-99-1, uses  
 and miscellaneous 1314-13-2, uses and miscellaneous 1314-23-4,  
 uses and miscellaneous 1333-88-6 12003-84-8 12004-35-2  
 12032-52-9 12055-23-1 12060-58-1 12068-51-8 12252-80-1  
 13463-67-7, uses and miscellaneous 65405-38-1 82620-12-0  
 (alumina abrasives contg., synthesis and properties of)

L44 ANSWER 18 OF 23 HCA COPYRIGHT 2007 ACS on STN  
 AN 69:70955 HCA Full-text  
 TI Preparation of monocrystalline metal oxide  
 AU Harari, A.; Thery, J.; Collongues, R.  
 CS Centre Etud. Chim. Met., Vitry-sur-Seine, Fr.  
 SO Revue Internationale des Hautes Temperatures et des Refractaires ( 1967), 4(3), 207-9  
 CODEN: RIHTAV; ISSN: 0035-3434  
 DT Journal  
 LA French  
 AB The oxide of Ti, Hf, Ce, and Th were crystd. in a Na2B4O7 flux, which dissolves 10-25 wt. % oxide at the temps. used. The flux is sol. in boiling or slightly acidic H2O, thus allowing retrieval of the crystals. The flux-oxide mixt. (10 g.) was melted in a Pt crucible placed in a vertical oven with a SiC heating element. The cycle consisted of an initial, fairly rapid temp. increase beyond the crystn. temp. to ensure proper soln. of the oxide, of a prolonged evapn. stage (3-10 days) at a temp. dependent on the flux and on the eventual transformations of the dissolved oxide, and of slow cooling (5-10°/ hr.) to apprx. 900°. Needles of rutile (5-10 mm.) were obtained after soln. at 1300° and flux-evapn. at 1200°. ZrO2 crystd. in the monoclinic system (5-8 mm. crystals) at a temp. cycle below 1150°, the evapn. stage being set at 1120°. HfO2 crystd. in monoclinic platelets (2-3 mm.) stable up to 1700°. CeO2 and ThO2 formed cubes of 1-2 mm. edge. The accompanying formation of CeB03 and ThB205 could be avoided by operating at high temps. and an excess of B2O3. Besides TiO2 and ThO2, a compd. of the system TiO2-ThO2 was prepd. ThTi2O6 exists in 2 forms,  $\alpha$  and  $\beta$ , the transformation  $\alpha \rightarrow \beta$  taking place at 1300°. The structure of  $\alpha$  (5-8 mm. needles) is unknown, and that of  $\beta$  is monoclinic.

IT 1306-38-3  
 (crystal growth of, from borax flux)  
 RN 1306-38-3 HCA  
 CN Cerium oxide (CeO2) (CA INDEX NAME)

O==Ce==O

CC 70 (Crystallization and Crystal Structure)  
IT 1306-38-3 1314-20-1, properties 1314-23-4, properties  
12055-23-1 13463-67-7, properties  
(crystal growth of, from borax flux)

L44 ANSWER 19 OF 23 HCA COPYRIGHT 2007 ACS on STN  
AN 68:49069 HCA Full-text  
TI Catalyst for the preparation of formaldehyde from methanol  
IN Kupiec, Stefan  
PA Zaklady Azotowe  
SO Pol., 2 pp.  
CODEN: POXXA7  
DT Patent  
LA Polish  
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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PI	PL 53678		19670725	PL	196405 04

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AB A catalyst showing high activity, stability, and selectivity and contg. MoO<sub>3</sub> activated with CeO<sub>2</sub> was prepd. Thus, 10% NH<sub>3</sub> was added to 35 kg. Ce(SO<sub>4</sub>)<sub>2</sub>·4H<sub>2</sub>O dissolved in 200 l. H<sub>2</sub>O until pH 0.9 was attained and the soln. (A) was filtered. HCl (10%) was added to 50 kg. (NH<sub>4</sub>)<sub>6</sub>MoO<sub>24</sub>·4H<sub>2</sub>O dissolved in 900 l. H<sub>2</sub>O until a soln. (B) of pH 2.6 was attained. Then, solns. A and B were added simultaneously under stirring to 200 l. HCl having pH 0.8 and temp. 65°, the stirring was stopped, and the ppt. was filtered off, washed, and dried with an air-stream at 70° in layers 30 mm. thick during 24 hrs. and then at 110° during 12 hrs. The catalyst was placed in a cylindrical reactor in such a way as to obtain a layer 350 mm. thick, air was passed through the reactor at the rate of 2,000 hr.<sup>-1</sup>, the temp. was raised by 30°/hr. up to 340°, and this temp. was maintained for 5 hrs. The product was powd. and mixed with H<sub>2</sub>O to obtain a paste, the paste was dried at 20° in an air-stream in layers 10 mm. thick during 24 hrs. The product, contg. .apprx.8% H<sub>2</sub>O, was ground to grain-size of .apprx.1 mm., 2% graphite was added, cylindrical pellets 5 + 5 mm. were prepd., and the pellets were dried at 60° during 8 hrs. and then at

110. degree. during 6 hrs. A mixt. of air contg. 7% MeOH was passed over the catalyst at 270-380° at the rate of 8,000 hr.-1 and >90% of the MeOH was converted into HCHO with a selectivity of oxidn. of >96%. The catalyst was used for 0.5 year.

IT 1306-38-3

(catalyst from molybdenum oxide (MoO<sub>3</sub>) and, for methanol oxidn.)

RN 1306-38-3 HCA

CN Cerium oxide (CeO<sub>2</sub>) (CA INDEX NAME)



IC C07C

CC 23 (Aliphatic Compounds)

IT 1306-38-3

(catalyst from molybdenum oxide (MoO<sub>3</sub>) and, for methanol oxidn.)

L44 ANSWER 20 OF 23 HCA COPYRIGHT 2007 ACS on STN

AN 67:75701 HCA Full-text

TI High temperature oxidation and produced oxides of iron-cerium alloys

AU Nakayama, Tadayuki; Fujikawa, Hisao

CS Waseda Univ., Tokyo, Japan

SO Nippon Kinzoku Gakkaishi (1965), 29(10), 990-5

CODEN: NIKGAV; ISSN: 0021-4876

DT Journal

LA Japanese

AB The oxidn. behavior was studied of 0.008-0.470 wt. % Ce-Fe alloys in air at high temps. (800°, 3 hrs.; 1000°, 2 hrs.), particularly the oxide layers produced on them under the same oxidn. conditions. The Ce concn. was enriched along the inner oxide layer in contact with the surface of the 0.025 wt. % Ce-Fe alloy which was oxidized at 800° for 3 hrs. At the

higher temp. (1000°, 2

hrs.), the 0.470 wt. % Ce-Fe alloy was covered with the thick oxide layer of high Ce concn. The x-ray diffraction patterns obtained from inner oxide layers of the alloys contg. Ce >0.292 wt. % after the oxidn. at 800° for 3 hrs. showed the existence of the CeFeO<sub>3</sub> phase (perovskite type, pseudocubic a<sub>0</sub> 3.915 Å.), besides Fe oxides. CeFeO<sub>3</sub> and CeO<sub>2</sub> crystals were also detected in inner oxide layers produced on the alloys contg. Ce >0.232 wt. % by the higher temp. oxidn. (1000°, 2 hrs.).

CeFeO<sub>3</sub> crystals were not produced by sintering α-Fe<sub>2</sub>O<sub>3</sub>-CeO<sub>2</sub> and Fe<sub>3</sub>O<sub>4</sub>-CeO<sub>2</sub> mixts. in vacuum (.apprx.10<sup>-3</sup> mm. Hg) at the same temps. as used for the oxidn. expts. of Fe-Ce alloys and at 1200° for 24 hrs. CeFeO<sub>3</sub>

crystals, however, were observed by the x-ray diffraction method when the FeO-CeO<sub>2</sub> mixt. was sintered under the same conditions. The formation mechanism of CeFeO<sub>3</sub> crystals detected in the inner oxide layer of Fe-Ce alloys depends on the solid reaction of FeO and CeO<sub>2</sub> crystals at high temps.

IT 1306-38-3P

(formation of, in oxidn. of iron contg. cerium at high temp.)

RN 1306-38-3 HCA

CN Cerium oxide (CeO<sub>2</sub>) (CA INDEX NAME)



CC 55 (Ferrous Metals and Alloys)

IT 1306-38-3P 12218-12-1P

(formation of, in oxidn. of iron contg. cerium at high temp.)

L44 ANSWER 21 OF 23 HCA COPYRIGHT 2007 ACS on STN

AN 66:51523 HCA Full-text

TI Spherical particles for use in nuclear fuel elements and a process for producing them

PA Minnesota Mining and Manufacturing Co.

SO Brit., 9 pp.

CODEN: BRXXAA

DT Patent

LA English

FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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PI GB 1054783

19670111

GB

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DE 1467344

DE

PRAI US

19620625 <--

AB A method is described to produce spherical particles for nuclear fuel elements. For example, a mixt. contg. 750 parts uranyl nitrate hexahydrate and 35.8 parts finely divided Thermax Brand C is heated to 90°. A high shear bar turbine impeller is rotated in the melt for 15 min. at 14,500 rpm. A hollow cone spray nozzle at 90° and with a spray pressure of 37 psi. produces a range of particles 50-250 μ in diam. The nozzle is placed about 1 in. from the upper surface of the liquid in the vessel 6 in. in diam. and 3 ft. long contg. fluorocarbon FC-75 at 10°. The fluorocarbon liquid is circulated

from the vessel through a cooler and back to the vessel. The molten spray forms spherical particles of uranyl nitrate hexahydrate contg. C. The particles settle to the bottom of the vessel where they are removed through a valve located at the lowest point. An amt. of liquid remains with the spherical particles and the slurry thus obtained is spread on trays. The solvent is permitted to evap. Then the dried particles are screened through sieves of mesh size 60 to mesh size 270 in a shaking device. Particles retained on the mesh size 60 or which pass the mesh size 270 are recycled. The other dried spherical particles are placed in a flask at 15-30 torr, rotated at 100 rpm. while the temp. is slowly raised to 300° in 9 hrs. The temp. is kept 1st at 40° for a sufficient time to eliminate 3 mols. H2O of hydration, then at 80° to remove the last H2O mol. of hydration. Then the temp. is raised to 250-300° to accomplish denitration. The particles are then cooled to room temp. They are perfectly spherical and consist of a mixt. of UO3 and C 50-250 μ in diam.

IT 1306-38-3P  
(solid solns. with uranium oxide (UO2), manuf. of  
spherical nuclear reactor fuel particles of)  
RN 1306-38-3 HCA  
CN Cerium oxide (CeO2) (CA INDEX NAME)



IC C01G  
CC 76 (Nuclear Technology)  
IT 409-21-2P, preparation 1305-78-8P, preparation 1306-38-3P  
1313-96-8P 1314-23-4P, preparation 13463-67-7P, preparation  
(solid solns. with uranium oxide (UO2), manuf. of  
spherical nuclear reactor fuel particles of)

L44 ANSWER 22 OF 23 HCA COPYRIGHT 2007 ACS on STN

AN 64:102165 HCA Full-text

OREF 64:19148e-h,19149a-c

TI Influence of the gaseous medium on chemical reactions and  
polymorphic transformations in the system zirconium dioxide-cerium  
oxides

AU Leonov, A. I.; Keler, E. K.; Andreeva, A. B.

CS I. V. Grebenshchikov Inst. Chem. Silicate, Leningrad, USSR

SO Ogneupory (1966), 31(3), 42-8

CODEN: OGNPA2; ISSN: 0369-7290

DT Journal

LA Russian



AB The phase diagram of the system  $\text{ZrO}_2\text{-CeO}_2$  (in an oxidizing atm.), known from previous studies, is entirely different from that of the system  $\text{ZrO}_2\text{-Ce}_2\text{O}_3$  (in an atm. with a very low partial pressure of O, including vacuum) is studied. In this system, the monoclinic ( $< 1000^\circ$ ) and the tetragonal ( $> 1000^\circ$ , degree.)  $\text{ZrO}_2$  dissolves approx. 3 mole %  $\text{Ce}_2\text{O}_3$ . At concns. from 3 to 27 mole %  $\text{Ce}_2\text{O}_3$  there are several 2-phase regions contg. a solid soln. of monoclinic or tetragonal  $\text{ZrO}_2$ , and a solid soln. on the basis of the chem. compd.  $\text{Ce}_2\text{Zr}_2\text{O}_7$ . High-temp. phases are composed of a pseudo-cubic solid solns. of  $\text{ZrO}_2$  in the interval 5-17 mole %  $\text{Ce}_2\text{O}_3$  continuously transgressing into a cubic structure, stable above  $1700^\circ$ . On the  $\text{ZrO}_2$  side, there is a 2-phase region contg. the cubic and the tetragonal solid soln. of  $\text{ZrO}_2$ ; on the  $\text{Ce}_2\text{O}_3$  side there are solid solns. of  $\text{Ce}_2\text{Zr}_2\text{O}_7$  and cubic solid solns. of  $\text{ZrO}_2$ . The phase contg. 33.33 mole %  $\text{Ce}_2\text{O}_3$  is the cubic compd.  $\text{Ce}_2\text{Zr}_2\text{O}_7$ , with  $a = 10.70 \text{ \AA}$ . It forms a solid soln. in the interval 26-40 mole %  $\text{Ce}_2\text{O}_3$  at  $1650^\circ$ . At higher  $\text{Ce}_2\text{O}_3$  concn. from 40 to 65 mole %  $\text{Ce}_2\text{O}_3$  at  $1650^\circ$ , a 2-phase region appears: solid soln. of  $\text{Ce}_2\text{Zr}_2\text{O}_7$  and of  $\text{ZrO}_2$ , narrowing with increasing temps. From 65 to 77 mole %  $\text{Ce}_2\text{O}_3$  there appears a metastable cubic solid soln. of  $\text{ZrO}_2$  and a solid soln. on the basis of the hexagonal structure of  $\text{Ce}_2\text{O}_3$ . Parameters of this structure are  $a = 3.89$  and  $c = 6.05 \text{ \AA}$ . The calcd.  $d$  is 6.87, color yellow-green, m.p.  $2160 \pm 30^\circ$ . Dilatometric measurements in H established that in the interval 0-27 mole %  $\text{Ce}_2\text{O}_3$  the polymorphic  $\text{ZrO}_2$  transformation monoclinic tetragonal takes place, with a hysteresis in the interval  $900\text{-}1200^\circ$ . With increasing concn. of  $\text{Ce}_2\text{O}_3$  the dimension changes decrease and at 27-30 mole %  $\text{Ce}_2\text{O}_3$  disappear.  $\text{CeO}_2$  is the most effective stabilizer of  $\text{ZrO}_2$ , probably due to the  $\text{Ce}^{4+}$  radius. Related literature data show strong deviations from each other. X-ray diagrams are given of the 50 mole %  $\text{CeO}_2$  stabilized (in O-contg. atm.)  $\text{ZrO}_2$  before and after its treatment at  $1400^\circ$ , in H, or at a partial pressure of O  $< 1.4 + 10^{-5}$  atm., resulting in the formation of  $\text{Ce}_2\text{Zr}_2\text{O}_7$ . Curves of the thermographic analysis in air of  $\text{Ce}_2\text{O}_3$ -stabilized  $\text{ZrO}_2$  as a function of the  $\text{Ce}_2\text{O}_3$  content in the range 20-60 mole %  $\text{Ce}_2\text{O}_3$  show a double max. exothermic effect in the region  $250^\circ$  (at 20 mole %), and  $150^\circ$  (at 60 mole %  $\text{Ce}_2\text{O}_3$ ), strongly increasing with the  $\text{Ce}_2\text{O}_3$  concn. Above  $1000^\circ$ , no appreciable thermal effects are observed. The effect is caused by the oxidation of  $\text{Ce(III)}$  into  $\text{Ce(IV)}$ . Small effects are caused by the polymorphic transformations (with 20 mole %  $\text{Ce}_2\text{O}_3$  an endothermic effect at  $1130^\circ$ , on heating, an exothermic effect at  $1040^\circ$ , on cooling). Sample with 33.33 mole %  $\text{Ce}_2\text{O}_3$  shows upon heating an endothermic effect at  $1056^\circ$  and an exothermic effect at  $1150^\circ$ , in conformity with the x-ray analysis. Oxidation of  $\text{Ce(III)}$  in air is appreciable at  $200^\circ$  causing a change in the lattice parameters, but without a change of the structure of the solid soln. At temps.  $100\text{-}800^\circ$ , the  $\text{CeO}_2$  produced

forms with ZrO<sub>2</sub> a metastable phase which decomp. at 1200°, resulting in the formation of tetragonal and cubic equil. solid soln. of the system ZrO<sub>2</sub>-CeO<sub>2</sub>. In the absence of a full stabilization of ZrO<sub>2</sub>, e.g. with <40 mole % CeO<sub>2</sub>, produced by the low-temp. oxidn. of Ce<sub>2</sub>O<sub>3</sub>, strong dimensional changes as a function of temp. occur. Redn.-oxidn. cycling of samples at 1200° shows an increase of dimensions at redn., and a decrease on oxidn. In an inert gas atm., no change occurs. After oxidn.-redn. cycling, samples became porous and full of cracks. 21 references.

IT 1345-13-7, Cerium oxide, Ce<sub>2</sub>O<sub>3</sub>  
(reaction with ZrO<sub>2</sub>, 0 effect on)  
RN 1345-13-7 HCA  
CN Cerium oxide (Ce<sub>2</sub>O<sub>3</sub>) (CA INDEX NAME)  
\*\*\* STRUCTURE DIAGRAM IS NOT AVAILABLE \*\*\*  
IT 1306-38-3, Cerium oxide, CeO<sub>2</sub>  
(reactions with ZrO<sub>2</sub>, 0 effect on)  
RN 1306-38-3 HCA  
CN Cerium oxide (CeO<sub>2</sub>) (CA INDEX NAME)



CC 21 (Ceramics)  
IT 1345-13-7, Cerium oxide, Ce<sub>2</sub>O<sub>3</sub>  
(reaction with ZrO<sub>2</sub>, 0 effect on)  
IT 1306-38-3, Cerium oxide, CeO<sub>2</sub>  
(reactions with ZrO<sub>2</sub>, 0 effect on)  
  
L44 ANSWER 23 OF 23 HCA COPYRIGHT 2007 ACS on STN  
AN 64:25426 HCA Full-text  
OREF 64:4649a-e  
TI Pilot plant processing of monazite sands to rare earth salts in  
Czechoslovakia  
AU Holub, Ludek  
CS Spolana, Neratovice, Czech.  
SO Chemicky Prumysl (1965), 15(10), 577-81  
CODEN: CHPUA4; ISSN: 0009-2789  
DT Journal  
LA Czech  
AB Rare earth (RE) chem. and a discussion of existing methods for  
industrial processing of monazite sands are briefly reviewed. In the  
pilot plant monazite sand is sepd. electromagnetically and the middle  
magnetic fraction contg. monazite is ground in a ball mill so that  
74, 25, and 1 percent passes through the sieves of 0.075, 0.1, and  
0.12 mm., resp. A charge of monazite (15 kg.) was mixed with a 47%

NaOH soln. contg. 22.5 kg. NaOH. The decompn. was carried out at 125-130° for 3 h. The decompd. mixt. was poured into 360 l. H2O at 80° and mixed at this temp. for 15 min. After the settling of the ppt., the strongly alk. soln. was filtered and then decanted twice with 110 l. H2O at 80°. The 1st filtrate was concd. to 96 l., and after cooling, 15.2 kg. Na3PO4.12H2O and 53 l. 20% NaOH soln. (13.5 kg. NaOH) were obtained. The ppt. of RE and Th hydroxides was suspended in a small vol. of mother liquor and washed with 110 l. H2O at 80°. The ppt. (17.2 kg.) was dissolved in 14 l. concd. HCl. The temp. increased spontaneously to 70° and then was maintained at 80° for 40 min. until the ppt. dissolved. After dilg. to 63 l. with H2O and neutralization to pH 3 with a 25% aq. NH3, Th(OH)4 was pptd. at 80°. Neutralization was continued to pH 4.2 until the IO3- test for Th4+ was neg. The raw Th(OH)4 was filtered and twice decanted at 80° with 53 and 30 l. H2O contg. 100 g. NH4Cl. The Th(OH)4 was then dissolved in 2 l. of concd. HCl at 80° and 4 l. of H2O added; the soln. was neutralized with 1.2 l. 25% aq. NH3 to pH 3. The undecompd. monazite was filtered and to the filtrate 0.28 kg. of oxalic acid was added. Raw Th oxalate (0.36 kg.) was filtered after 24 h. The RE chlorides soln. (112 l.) was concd. to 28 l. at 120-135° and 10 kg. of Ce chlorides, readily sol. in H2O, was obtained. These were used directly for the electrolytic prodn. of ferrocerium. The electrolytic waste was either processed to mixed RE oxides suitable as grinding and polishing material for optical glass or used for CeO2 prodn. The method described was used for Chinese and Korean monazite sands imported to Czech.

IT 1306-38-3P, Cerium oxide, CeO2  
 (recovery of, from monazite sands)  
 RN 1306-38-3 HCA  
 CN Cerium oxide (CeO2) (CA INDEX NAME)



CC 17 (Industrial Inorganic Chemicals)  
 IT 1306-38-3P, Cerium oxide, CeO2 7790-86-5P, Cerium chloride  
 (recovery of, from monazite sands)

=> D HIS L46-

FILE 'HCA'

L46 352312 S (2 OR 5 OR 10 OR 15 OR 20 OR 25 OR 30 OR 35 OR 40 OR 45  
 L47 435 S (L4 OR L14 OR L15) AND L46

L48 1 S L47 AND L5  
 L49 5 S L47 AND L6  
 L50 28 S L47 AND L7  
 L51 7 S L47 AND L26  
 L52 297 S L47 AND L27  
 L53 21 S L50 AND L52  
 L54 23 S (L48 OR L49 OR L50 OR L51 OR L53) NOT (L42 OR L43 OR L4  
 L55 7 S 1840-2002/PY,PRY AND L54  
 L56 16 S L54 NOT L55

=> D L55 1-7 BIB ABS HITSTR HITIND

L55 ANSWER 1 OF 7 HCA COPYRIGHT 2007 ACS on STN  
 AN 140:66547 HCA Full-text  
 TI Phases formation rate at synthesis of actinide waste forms  
 AU Laverov, N. P.; Yudintsev, S. V.; Lapina, M. I.; Stefanovsky, S. V.;  
 Chae, S. C.; Ewing, R. C.  
 CS IGEM RAS, Moscow, 119017, Russia  
 SO Materials Research Society Symposium Proceedings (2002),  
 Volume Date 2003, 757(Scientific Basis for Nuclear Waste Management  
 XXVI), 321-328  
 CODEN: MRSPDH; ISSN: 0272-9172  
 PB Materials Research Society  
 DT Journal  
 LA English  
 AB Rate of zirconolite ( $\text{CaZrTi}_2\text{O}_7$ ) and pyrochlores ( $\text{Gd}_2\text{Ti}_2\text{O}_7$ ,  $\text{CaCeTi}_2\text{O}_7$ ,  
 and  $\text{Gd}_2\text{Zr}_2\text{O}_7$ ) formation by cold pressing and sintering (CPS) was  
 studied. Batches were prepd. from  $\text{CaCO}_3$ ,  $\text{ZrO}_2$ ,  $\text{TiO}_2$ ,  $\text{CeO}_2$ , and  $\text{Gd}_2\text{O}_3$   
 milled to size of 20-30  $\mu\text{m}$ . Powders were compacted and sintered in  
 air (O) at 800-1600. degree. for 0.5-55 h. Samples were examd. with  
 XRD, SEM, and TEM. Phase formation rate was the fastest in Gd-Ti-O  
 and Ca-Ce-Ti-O systems and the reactions were the slowest in Gd-Zr-O  
 system. In zirconolite-based system reaction rate had intermediate  
 value. For 3 systems at 1400° equil. was reached in 3-5 h, while in  
 Gd-Zr-O system required .apprx.10 time longer reaction time. High  
 formation rate was evidently one of the reasons to select the  
 pyrochlore  $(\text{Ca,Gd,U,Pu})_2(\text{Hf,Ti})_2\text{O}_7$  as a host for Pu in the USA. The  
 authors have also studied an effect of Ti on pyrochlore formation in  
 the Gd-Zr-Ti-O system. The batches with nominal compn.  
 $\text{Gd}_2\text{Ti}_{0.4}\text{Zr}_{1.6}\text{O}_7$ ,  $\text{Gd}_2\text{Ti}_{0.2}\text{Zr}_{1.8}\text{O}_7$ , and  $\text{Gd}_2\text{Ti}_{0.1}\text{Zr}_{1.9}\text{O}_7$  were compacted  
 and annealed at 1500-1600° for 3-98 h. In most of them along with  
 pyrochlore unreacted Zr and Gd oxides were found. Their content  
 reduced with temp. and sintering duration increasing. Pyrochlore  
 compn. was varied in different parts of the samples. Variation range  
 decreased with rise of temp., runs duration, and Ti content in the

precursors. Partial substitution of Ti for Zr increased rate of pyrochlore formation. However, even at the highest Ti content (0.4 formula units) and temp. of synthesis (1600°) too long sintering duration in tens of hours is required to form a single-phase pyrochlore matrix. This makes their prodn. from oxide precursor via CPS route inefficient. Inductive melting in a cold crucible or self-sustaining high-temp. synthesis are more promising methods for fabrication of the zirconate pyrochlores.

IT 1306-38-3, Cerium oxide (CeO<sub>2</sub>), reactions  
(phases formation rate at synthesis of  
actinide waste forms)

RN 1306-38-3 HCA

CN Cerium oxide (CeO<sub>2</sub>) (CA INDEX NAME)



CC 71-11 (Nuclear Technology)

Section cross-reference(s): 57

IT 471-34-1, Calcium carbonate (CaCO<sub>3</sub>), reactions 1306-38-3,  
Cerium oxide (CeO<sub>2</sub>), reactions 1314-23-4, Zirconium  
oxide (ZrO<sub>2</sub>), reactions 12064-62-9, Gadolinium oxide (Gd<sub>2</sub>O<sub>3</sub>)  
13463-67-7, Titanium oxide (TiO<sub>2</sub>), reactions  
(phases formation rate at synthesis of  
actinide waste forms)

RE.CNT 18 THERE ARE 18 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L55 ANSWER 2 OF 7 HCA COPYRIGHT 2007 ACS on STN

AN 138:94509 HCA Full-text

TI Catalyst for treating automotive exhaust gases and its preparation

IN Shen, Dixin; Chen, Hongda; Tian, Qun; He, Zhanyuan

PA Ecological Environment Research Center, Chinese Academy of Sciences,  
Peop. Rep. China

SO Faming Zhuanli Shenqing Gongkai Shuomingshu, 14 pp.

CODEN: CNXXEV

DT Patent

LA Chinese

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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PI	CN 1342520	A	20020403	CN 2000-124737	200009 14

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PRAI CN 2000-124737 20000914 <--

AB The title catalyst is prepd. by impregnating an iolite honeycomb ceramic with Al<sub>2</sub>O<sub>3</sub> slurry contg. La<sub>2</sub>O<sub>3</sub>, CeO<sub>2</sub>, noble metal, transition metal and alk. earth metal, drying, calcining at 400-600. degree. for 2-6 h, reducing at 400-600. degree. for 2-6 h, and coating. The slurry contains La 1-4, Ce 3-12, Pt 0.1-0.25, Pd 0.1-0.25, Rh 0.05-0.3, Mg, Ba and/or Sr 2-7%. The catalyst is highly durable and active for treating exhaust gases contg. NO<sub>x</sub>, CO and hydrocarbons at various temp. range.

IT 1306-38-3, Cerium dioxide, uses  
(catalyst for treating automotive exhaust gases and its  
prepn.)

RN 1306-38-3 HCA

CN Cerium oxide (CeO<sub>2</sub>) (CA INDEX NAME)



IC ICM B01J023-62

ICS B01J037-02; B01D053-94

CC 59-3 (Air Pollution and Industrial Hygiene)  
Section cross-reference(s): 67

IT 1306-38-3, Cerium dioxide, uses 1312-81-8, Lanthanum  
trioxide  
(catalyst for treating automotive exhaust gases and its  
prepn.)

L55 ANSWER 3 OF 7 HCA COPYRIGHT 2007 ACS on STN

AN 137:156822 HCA Full-text

TI Production of cerium (IV) ammonium nitrate.

IN Tanaka, Shinya; Ishikawa, Junichi

PA Sumitomo Chemical Co., Ltd., Japan

SO Jpn. Kokai Tokkyo Koho, 8 pp.

CODEN: JKXXAF

DT Patent

LA Japanese

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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	-----				
PI	JP 2002220229	A	20020809	JP 2001-10025	200101 18

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AB The process comprises adding seed crystals into a cerium (IV) ammonium nitrate aq. soln. at a temp. of T1 to (T1-10°) (e.g., 80-100°), where T1 is the satn. temp. of cerium (IV) ammonium nitrate, then cooling the aq. soln. to  $\leq 30^\circ$  at av. cooling speed of 25°/h for pptg. cerium (IV) ammonium nitrate crystals. The cerium (IV) ammonium nitrate aq. soln. can be obtained by dissolving, e.g., cerium (IV) oxide hydrate or cerium (IV) hydroxide in a nitric acid aq. soln., and then mixing with ammonium nitrate; ammonium nitrate aq. soln. can be used as the above stated ammonium nitrate. In the above stated process, after adding the seed crystals, the aq. soln. can be kept in a temp. range of (50-90°)±5° for  $\geq 30$  min, and then cooling to  $\leq 30^\circ$ .

IT 6484-52-2, Ammonium nitrate, reactions 12014-56-1, Cerium (IV)  
hydroxide 23322-64-7, Cerium oxide (  
CeO2), hydrate  
(prodn. of cerium (IV) ammonium nitrate)

FAN.CNT 1

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200010  
26

 $\angle$  --

200110  
17

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W: AL, AM, AT, AU, AZ, BB, BG, BR, BY, CA, CH, CN, CZ, DE, DK,  
EE, ES, FI, GB, GE, HU, IL, IS, JP, KE, KG, KP, KR, KZ, LK,  
LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT,  
RO, RU, SD, SE, SG, SI, SK, TJ, TM, TR, TT, UA, UG, US, UZ,

VN, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM  
RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH,  
CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE,  
TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN,  
TD, TG

AU 2002012874 A5 20020506 AU 2002-12874

200110  
17

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PRAI RU 2000-126801 A 20001026 <--  
WO 2001-RU423 W 20011017 <--

AB The Sitall glass ceramic contains SiO<sub>2</sub> 57-70, Li<sub>2</sub>O 12.7-19, NaPO<sub>3</sub> 2-4, K<sub>2</sub>O 1.7-2.5, CaF<sub>2</sub> 0.9-1.2, LiF 4-8, CeO<sub>2</sub> 0.1-1, TiO<sub>2</sub> 0.1-9, CaO 0.1-4, MnO/MnO<sub>2</sub> = 0.1-4, Al<sub>2</sub>O<sub>3</sub> 0.1-4 wt.%. The high-strength Sitall is manufd. from lithium-silicate glass by melting at 1300-1350°, forming of specimens by pouring into a cold mold, annealing at 400-420°, and two-stage thermal treating after annealing by rising temp. to 480-520°, holding for 2-3 h, rising temp. to 680-720° with the rate of 1-4 degrees per min, holding for 1-2 h followed by cooling in air to the room temp. Obtained low-melting polycryst. glass exhibits high strength in combination with low d. and can be used under conditions of extreme loadings.

IT 1306-38-3, Cerium oxide (CeO<sub>2</sub>), uses  
(Sitall component; manuf. of high-strength polycryst.  
Sitall-type glass ceramic)

RN 1306-38-3 HCA

CN Cerium oxide (CeO<sub>2</sub>) (CA INDEX NAME)



IC ICM C03C010-12

CC 57-1 (Ceramics)

IT 1305-78-8, Calcium oxide (CaO), uses 1306-38-3, Cerium oxide (CeO<sub>2</sub>), uses 1313-13-9, Manganese oxide (MnO<sub>2</sub>), uses 1344-28-1, Alumina, uses 1344-43-0, Manganous oxide, uses 7789-75-5, Calcium fluoride (CaF<sub>2</sub>), uses 10361-03-2, Sodium phosphate (NaPO<sub>3</sub>) 12136-45-7, Potassium oxide (K<sub>2</sub>O), uses 13463-67-7, Titanium dioxide, uses  
(Sitall component; manuf. of high-strength polycryst.  
Sitall-type glass ceramic)

L55 ANSWER 5 OF 7 HCA COPYRIGHT 2007 ACS on STN

AN 132:328987 HCA Full-text

TI Preparation of ultrafine CeO<sub>2</sub> particles by using



different methods. II. Frozen dehydration method and urea decomposition method

AU Hou, Wen-Hua; Xu, Lin; Chen, Li-gang; Yan, Qi-jie; Chen, Jing  
CS Department of Chemistry, Nanjing University, Nanjing, 210093, Peop.  
Rep. China

SO Nanjing Daxue Xuebao, Ziran Kexue (2000), 36(1), 100-103  
CODEN: NCHPAZ; ISSN: 0469-5097

PB Nanjing Daxue

DT Journal

LA Chinese

AB This paper reports the prepn. of ultrafine CeO<sub>2</sub> particles by using frozen dehydrating method and urea decompn. method. The results are compared with that of sol-gel method. It is found that reaction temp.(Tr), ammonia concn.(Ca) and calcination temp.(Tc) significantly affect the particle size and the surface area of the product for frozen dehydrating method. TEM results show that gelatinized at 0°C, CeO<sub>2</sub> particles with an av. particle size of 7 nm and a surface area of 89 m<sup>2</sup>/g are obtained, while raising the gelatinization temp. to 25°C, the av. size increases to 16 nm and surface area decreases to 73 m<sup>2</sup>/g, resp. It can be explained that at higher temp., the particles with high surface energy collide more frequently and are easy to aggregate hence the av. particle size increases and surface area decreases. The ammonia concn. also affects the particle size of CeO<sub>2</sub>. Too high an ammonia concn. will give larger particles. CeO<sub>2</sub> particles prepd. by frozen dehydrating method have high surface activity and therefore are easy to aggregate while calcining at 400. degree.C would lead to sintering. CeO<sub>2</sub> prepd. by urea decompn. method calcined at 400. degree.C for 2 h is brick-shaped and porous with an av. particle diam. beyond 500 nm, a high surface area of 127 m<sup>2</sup>/g and an av. pore diam. of 2.1 nm. XRD result shows that the product compn. as prepd. is Ce<sub>2</sub>O(CO<sub>3</sub>)<sub>2</sub>·H<sub>2</sub>O; IR spectrum confirms the existence of CO<sub>2</sub>-3. DTA anal. suggests that Ce<sub>2</sub>O(CO<sub>3</sub>)<sub>2</sub>·H<sub>2</sub>O first dehydrates to form Ce<sub>2</sub>O(CO<sub>3</sub>)<sub>2</sub> and then decompn. at 277°C to form CeO<sub>2</sub>. Comparing sol-gel, frozen dehydrating and urea decompn. method, we can conclude that using sol-gel method an av. diam. around 10 nm ultrafine CeO<sub>2</sub> can be obtained at mild condition. The disadvantage of this method is that org. materials and NO-3 are not easy to remove. The CeO<sub>2</sub> particles prepd. by frozen dehydrating method at low temp. are fine and homogeneous and contain no org. materials, but it is easy to sinter. Using urea decompn. method we can prep. porous CeO<sub>2</sub> with high surface area, but the particle size is over 500 nm.

IT 1306-38-3P, Ceria, preparation  
(prepn. of ultrafine CeO<sub>2</sub> particles by using  
frozen dehydration and urea decompn. method)

RN 1306-38-3 HCA

CN Cerium oxide (CeO<sub>2</sub>) (CA INDEX NAME)



- CC 78-2 (Inorganic Chemicals and Reactions)  
Section cross-reference(s): 57
- IT Adsorption  
Decomposition  
Dehydration  
Particle size  
Precipitation (chemical)  
Surface activity  
Surface area  
(prepn. of ultrafine CeO<sub>2</sub> particles by using frozen dehydration and urea decompn. method)
- IT Organic compounds, processes  
(prepn. of ultrafine CeO<sub>2</sub> particles by using frozen dehydration and urea decompn. method)
- IT Particles  
(ultrafine; prepn. of ultrafine CeO<sub>2</sub> particles by using frozen dehydration and urea decompn. method)
- IT 1306-38-3P, Ceria, preparation 96390-65-7P,  
Cerium carbonate oxide (Ce<sub>2</sub>(CO<sub>3</sub>)<sub>2</sub>O)  
(prepn. of ultrafine CeO<sub>2</sub> particles by using frozen dehydration and urea decompn. method)
- IT 57-13-6, Urea, reactions 7664-41-7, Ammonia, reactions  
(prepn. of ultrafine CeO<sub>2</sub> particles by using frozen dehydration and urea decompn. method)
- IT 14797-55-8, Nitrate, processes  
(prepn. of ultrafine CeO<sub>2</sub> particles by using frozen dehydration and urea decompn. method)
- L55 ANSWER 6 OF 7 HCA COPYRIGHT 2007 ACS on STN
- AN 116:219883 HCA Full-text
- TI Synthesis of some phases in the metal-silicon-aluminum-oxygen-nitrogen system
- AU Teoreanu, Ion; Andronesco, Ecaterina; Dumitrescu, Lucia
- CS Inst. Politeh. Bucuresti, Bucharest, Rom.
- SO Materiale de Constructii (Bucharest, Romania) (1991),  
21(1), 33-5  
CODEN: MCTIBU; ISSN: 0253-0201
- DT Journal
- LA Romanian
- AB X-ray diffraction was used to study the effect of temp. (1400-1480. degree.), time (2-5 h), and oxide additives (Y<sub>2</sub>O<sub>3</sub>, CeO<sub>2</sub>, Nd<sub>2</sub>O<sub>3</sub>, and Nb<sub>2</sub>O<sub>5</sub>) on the phase distribution in the Si<sub>3</sub>N<sub>4</sub>-AlN-Al<sub>2</sub>O<sub>3</sub>-SiO<sub>2</sub> system

to optimize Si<sub>3</sub>N<sub>4</sub> synthesis. The yield of the Si<sub>3</sub>N<sub>4</sub> phase increased with increasing temp., time, and addn. of 1% oxides. The CeO<sub>2</sub> additive exerted the most significant pos. effect.

IT 1306-38-3, Ceria, properties  
 (phase formation in alumina-aluminum  
 nitride-silica-silicon nitride system in relation to)  
 RN 1306-38-3 HCA  
 CN Cerium oxide (CeO<sub>2</sub>) (CA INDEX NAME)



CC 57-2 (Ceramics)  
 IT 1306-38-3, Ceria, properties 1313-96-8, Niobium oxide  
 1313-97-9, Neodymia 1314-36-9, Yttria, properties  
 (phase formation in alumina-aluminum  
 nitride-silica-silicon nitride system in relation to)

L55 ANSWER 7 OF 7 HCA COPYRIGHT 2007 ACS on STN  
 AN 96:23880 HCA Full-text  
 TI Polishing compositions  
 IN Khaladji, Jean; Peltier, Marcel  
 PA Rhone-Poulenc Industries S. A., Fr.  
 SO Eur. Pat. Appl., 17 pp.  
 CODEN: EPXXDW

DT Patent  
 LA French

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	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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PI	EP 31749	A2	19810708	EP 1980-401773	198012 10
				<--	
	EP 31749	A3	19810722		
	EP 31749	B1	19830413		
	R: AT, BE, CH, DE, FR, GB, IT, NL, SE				
	FR 2472601	A1	19810703	FR 1979-31742	197912 27
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	FR 2472601	B1	19831202		
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AU 1980-65835

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AU 546390

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JP 56131686

A

19811015

JP 1980-184144

198012  
26

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JP 57058388

B

19821209

PRAI FR 1979-31742

A

19791227

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EP 1980-401773

A

19801210

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AB An abrasive material for polishing glass is obtained by reacting a Ce salt at pH >6.0, filtering the ppt., drying, and calcining at 600-1200° for 0.5-10

h. Thus, solns. of Ce(NO<sub>3</sub>)<sub>3</sub> 1 mol/L, 2N NH<sub>3</sub>, (NH<sub>4</sub>)<sub>2</sub>SO<sub>4</sub> 0.05, and NH<sub>4</sub>F 0.05 mol/L are fed into a reactor to maintain the pH at 8.9 ±0.1 (with a holding time of 1 h) and the temp. is raised from 25 to 75°. The ppt. is filtered, washed, dried, and calcined for 3 h at 850.degree ., and then ground to a particle size of <15 μ (>99.9%) to give an abrasive with a polishing efficiency of 27 mg/dm<sup>2</sup>/mn.

IC C09K003-14; C01F017-00

CC 57-7 (Ceramics)

IT Glass, oxide

(polishing of, cerium oxide abrasive for, prepn. and efficiency of)